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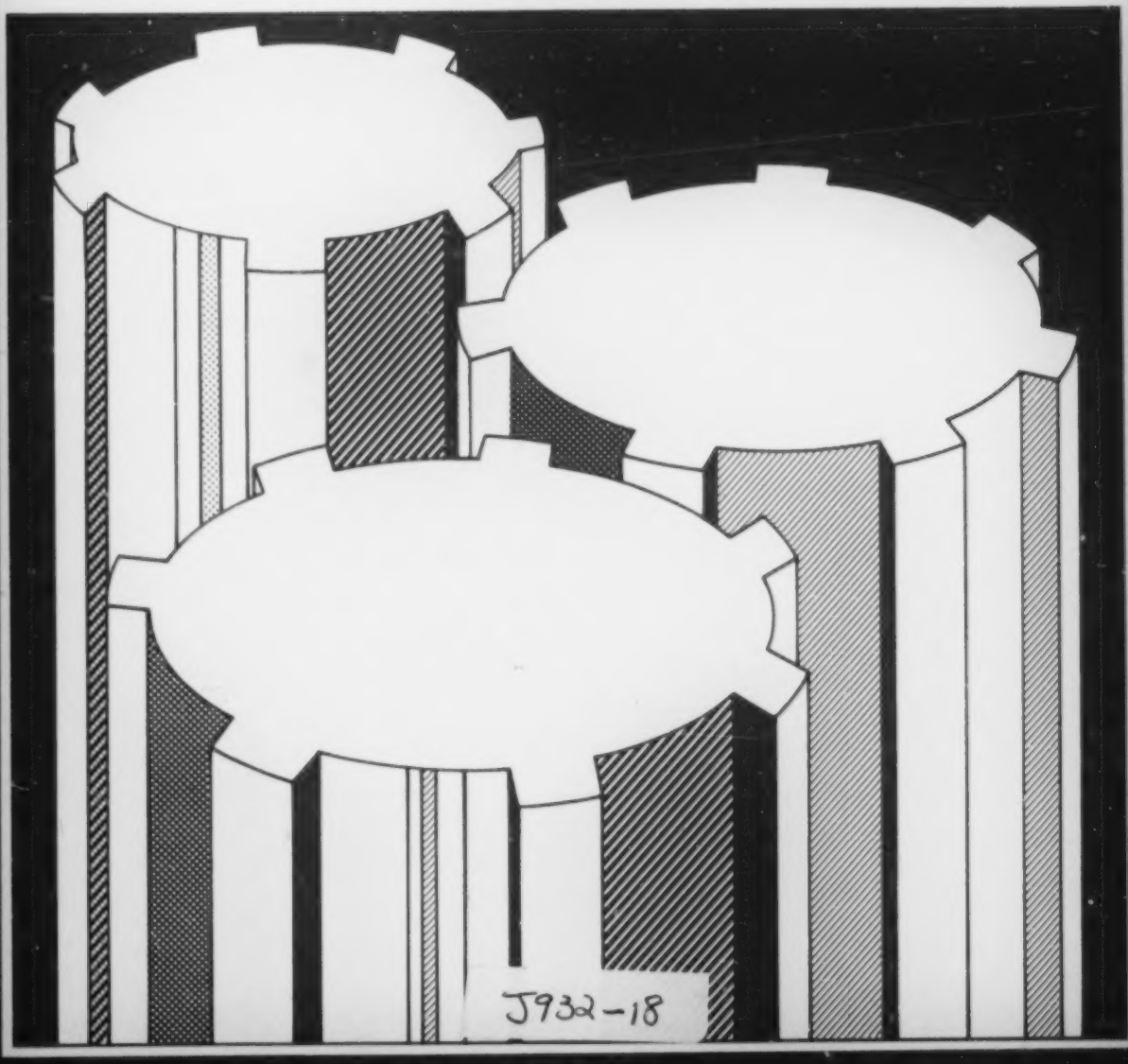
The Budgetary and Economic Effects of Oil Taxes



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CBO STUDY

THE BUDGETARY AND ECONOMIC EFFECTS OF OIL TAXES

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PREFACE

Taxes on oil or oil products have been suggested as a means of reducing the federal deficit. Beyond their revenue effects, oil taxes would have important implications for the domestic oil industry, for the economy in general, and for the security of U.S. energy supplies. At the request of the Chairman and the Ranking Minority Member of the Senate Budget Committee, this study investigates the budgetary and economic effects of various oil tax proposals. In keeping with the mandate of the Congressional Budget Office to provide objective analysis, the study makes no recommendations.

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April 1986

CONTENTS

	SUMMARY	ix
CHAPTER I	INTRODUCTION	1
	Rationales for Oil Taxes	1
	Major Assumptions of the Analysis	6
CHAPTER II	OIL TAXES AND THE FEDERAL BUDGET	11
	Oil Tax Options	11
	Effects on the Budget	13
CHAPTER III	OIL TAXES AND ENERGY POLICY	23
	Effects of Oil Taxes on the Level of Oil Imports	23
	Effects of Oil Taxes on Competing Fuels	26
	Effects of Oil Taxes on Domestic Oil Refiners	27
	A Variable Tariff	34
	Other Issues	36
CHAPTER IV	OTHER EFFECTS OF OIL TAXES	39
	Effects on U.S. Trade and Competitiveness	39
	Third-World Indebtedness	42
	Distributional Effects	43
	Exemptions and Refunds	53

TABLE 1	ASSUMPTIONS AS TO U.S. OIL SUPPLY AND DEMAND AT THREE PRICE LEVELS AND IN THE ABSENCE OF NEW OIL TAXES	3
TABLE 2	NET DEFICIT REDUCTION UNDER FIVE OIL TAX ALTERNATIVES	14
TABLE 3	APPROXIMATE TAX LEVELS NECESSARY TO ACHIEVE FIVE-YEAR NET DEFICIT REDUCTION LEVELS, FISCAL YEARS 1987-1991	15
TABLE 4	NET DEFICIT REDUCTION UNDER AN OIL IMPORT TARIFF OF $5.00 PER BARREL ON CRUDE OIL AND $10.00 PER BARREL ON REFINED PRODUCTS UNDER ALTERNATIVE OIL PRICE ASSUMPTIONS	16
TABLE 5	NET DEFICIT REDUCTION UNDER A $5.00 OIL EXCISE TAX UNDER ALTERNATIVE OIL PRICE ASSUMPTIONS	18
TABLE 6	NET DEFICIT REDUCTION UNDER A 12 CENTS PER GALLON MOTOR FUELS TAX UNDER ALTERNATIVE OIL PRICE ASSUMPTIONS	19
TABLE 7	NET DEFICIT REDUCTION UNDER A 5 PERCENT AD VALOREM TAX ON DOMESTIC ENERGY CONSUMPTION UNDER ALTERNATIVE OIL PRICE ASSUMPTIONS	21
TABLE 8	NET DEFICIT REDUCTION UNDER A COMBINATION OF A $2.50 OIL IMPORT TARIFF AND A 6 CENT PER GALLON MOTOR FUELS TAX UNDER ALTERNATIVE OIL PRICE ASSUMPTIONS	22

TABLE 9 ESTIMATED EFFECTS OF OIL TAXES ON AVERAGE ANNUAL FUEL EXPENDITURES OF HOUSEHOLDS, BY INCOME, 1982-1983 48

TABLE 10 ESTIMATED EFFECTS OF OIL TAXES ON AVERAGE ANNUAL FUEL EXPENDITURES OF HOUSEHOLDS, BY REGION, 1982-1983 51

TABLE 11 ESTIMATED EFFECTS OF OIL TAXES ON AVERAGE ANNUAL FUEL EXPENDITURES OF HOUSEHOLDS AT THREE LEVELS OF OIL PRICES, 1982-1983 52

SUMMARY

This paper analyzes taxes on oil or oil products. Such taxes have been proposed for a variety of purposes. One aim is to reduce the federal deficit. Another is to reduce U.S. dependence on imported oil and its attendent risks to the economy and to national security. Some advocates of oil taxes see them as driving down further the world price of oil. Taxes are also favored as a way to assist the domestic oil industry, which is undergoing a severe contraction.

Oil taxes would accomplish these goals in varying degree, depending on how a specific tax was designed. At one end of the spectrum, an oil import tariff would encourage conservation, the substitution of other fuels, and domestic exploration and production. At the other end, a general energy tax--such as an ad valorem tax on all fuels consumed--would lead to reductions in energy use but would do nothing to encourage the production and consumption of oil substitutes or the exploration and development of domestic oil supplies. Oil taxes also raise a variety of questions as to their effects on the economy, on foreign trade, on the distribution of income, and on specific industries such as refining.

This paper examines five oil tax options:

- An import tariff of $5.00 per barrel on imported crude oil and $10.00 per barrel on imported refined products;
- A $5.00 per barrel excise tax on all crude oil (domestic and imported) and $5.00 per barrel on imported refined products;
- A $0.12 per gallon motor fuels tax;
- A 5 percent sales tax on all energy consumption; and
- A combination of a $0.06 per gallon tax on motor fuels together with a $2.50 tariff on imported crude and refined products.

Since each tax would have different effects depending on the underlying level of world oil prices, and since there can be no certainty as to future oil prices, this report examines the taxes under three alternative assumptions:

that oil prices hold steady over the next five years at levels of $23.00 per barrel, $18.00 per barrel, or $13.00 per barrel.

Economic Assumptions

In estimating the economic and budgetary impacts of any tax, one must make some simplifying assumptions. In this case, perhaps the most important involves the operation of energy markets.

The economic effects of energy taxes depend to some degree on the response of foreign producers. This is difficult to forecast, because the governments of producing countries often play a crucial role in determining production levels. At one extreme, producers may respond by reducing production in order to maintain world prices at their pre-tax levels. At the other extreme, they may not change production at all and accept a fall in price equal to the implied per unit tax. This analysis makes an intermediate assumption. It assumes that world prices would fall, but by considerably less than the amount of the tax. Consequently, oil taxes would to some extent raise energy prices for U.S. consumers.

Analysts must also make some assumption about the behavior of aggregate production levels (gross national product, or GNP) in response to a tax. If foreign producers were forced to lower their prices, an oil tax could stimulate the economy and raise GNP. But there are offsetting influences. In the short term, higher taxes of any sort could lower GNP since they reduce household income. But to the extent that taxes also reduce the federal deficit, they may tend to reduce interest rates and the international value of the dollar, which would tend to raise GNP. In view of these various offsetting influences, and the fact that the net effect of any of the taxes on nominal GNP is likely to be rather small, CBO has followed the convention that nominal GNP (not adjusted for inflation) remains approximately constant in response to a tax.

Revenue and Outlay Effects

Oil taxes affect the budget on both the revenue and the outlay sides. On the revenue side, the federal government would collect the tariff or tax directly. In addition, some taxes would increase domestic oil prices and the stream of revenues produced by the crude oil windfall profit tax. Finally, on the assumption that nominal GNP remains approximately constant after the imposition of a tax, the taxes and resulting price increases in the oil sector would reduce the income and profit streams of corporations in other sectors of the economy, correspondingly reducing the taxes they pay to the government.

On the outlay side, the federal government is both a producer and a consumer of oil. As a producer, it would receive more royalties from oil and gas production from the outer continental shelf and other federal lands if oil taxes were to raise wellhead oil and gas prices. On the consumption side, federal agencies, principally the Department of Defense, use roughly 500,000 barrels of refined petroleum products per day; they would pay more if prices rose. Thus the net budgetary effect of oil taxes is likely to be less than the initial revenue collected.

In general, broader-based taxes, such as an excise tax or an energy tax, would reduce the federal deficit by more than would more narrowly defined taxes, such as an import tariff or a motor fuels tax, at the same level of tax. This is because the former would be imposed on a broader category of oil and/or energy sources. Moreover, because windfall profit tax collections and domestic oil prices are positively associated, the revenue differential between a tariff and an excise tax would widen if domestic oil prices fell. Estimates of the net budgetary effects of the tax proposals are given in the Summary Table. These estimates differ somewhat from those provided in CBO's *Reducing the Deficit: Spending and Revenue Options* because different assumptions regarding oil prices and other factors are used in this analysis. 1/

It should be noted that at the $23.00 and $18.00 levels, the import tariff of $5.00 per barrel on crude oil and $10.00 per barrel on refined products would have the same revenue effect as a flat $5.00 tariff on both imported crude and refined products: the extra $5.00 on refined products would make their importation prohibitive, resulting in no new funds. Consumer costs, in contrast to federal revenues, might rise as less efficient domestic refining capacity was brought into production. At $13.00 per barrel, however, petroleum product consumption would exceed domestic refining capacity, and the extra tariff on refined products would lead to additional revenues.

Energy Market Effects

The tax proposals described above raise a number of issues for federal policy and for the energy industry. Reductions in oil imports caused by oil taxes would be greater with lower initial oil prices, since a fixed tax represents a greater percentage increase in oil prices as underlying, pre-tax prices fall.

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1. In administering the budget process, the baseline assumptions of *Reducing the Deficit* would be used for scoring purposes.

SUMMARY TABLE. NET DEFICIT REDUCTION UNDER FIVE OIL TAX ALTERNATIVES, FISCAL YEARS 1987-1991
(In billions of current dollars)

Tax Alternative	1987	1988	1989	1990	1991
Pre-tax Oil Price: $23.00 per Barrel					
Import Tariff	8.1	8.3	8.6	8.8	9.0
Excise Tax	22.1	22.5	23.0	23.2	23.5
Motor Fuels Tax	8.8	8.9	9.1	9.1	9.3
Energy Tax	15.1	15.6	16.2	16.6	17.1
Combination of Taxes	8.6	8.7	9.0	9.2	9.6
Pre-tax Oil Price: $18.00 per Barrel					
Import Tariff	8.2	8.8	9.3	10.0	10.5
Excise Tax	24.0	24.6	25.1	25.5	26.0
Motor Fuels Tax	9.0	9.1	9.2	9.3	9.5
Energy Tax	14.1	14.5	15.2	15.7	16.2
Combination of Taxes	9.2	9.5	10.0	10.4	11.0
Pre-tax Oil Price: $13.00 per Barrel					
Import Tariff	8.9	9.9	10.6	11.5	12.2
Excise Tax	25.4	26.3	27.1	27.8	28.5
Motor Fuels Tax	9.2	9.2	9.3	9.3	9.5
Energy Tax	13.0	13.5	14.2	14.8	15.3
Combination of Taxes	10.1	10.8	11.5	12.2	13.0

SOURCE: Congressional Budget Office.

NOTES: *Import Tariff*: $5.00 per barrel imposed on crude oil and $10.00 per barrel on refined products.

Excise Tax: $5.00 per barrel imposed on all domestic and foreign crude oil and refined products.

Motor Fuels Tax: 12 cents per gallon ($5.04 per barrel) on all motor fuels.

Energy Tax: Ad valorem tax of 5 percent of final sale value of domestic and imported oil, natural gas, coal, and electricity.

Combination of Taxes: $2.50 per barrel on imported oil and 6 cents per gallon on motor fuels.

At $13.00 per barrel, oil imports in the absence of taxes are projected to reach 7.3 million barrels per day. An import tariff could reduce this amount by close to 1 million barrels per day by stimulating conservation and fuel substitution, and, very importantly, by softening the impact of low world prices on domestic oil production. Other taxes would not reduce imports by as much, because they would not provide domestic producers with additional incentives to explore or produce. At $23.00 and $18.00 per barrel, the effect of price changes on domestic production would not be as drastic, and hence an import tariff would not have as great an advantage over other taxes in this regard.

The effects of any oil tax in reducing oil imports, putting downward pressure on the world price of oil, and providing protection for the U.S. oil industry would be interrelated. Oil taxes would put downward pressure on the world price of oil only insofar as they led to a reduction in the U.S. demand for oil imports, and that reduction would be greater if a tax encouraged domestic exploration and production.

An oil import tariff would be superior to other energy taxes on this score. By raising the price of oil imports, an oil import tariff would encourage all activities that could substitute for oil imports: domestic oil production, production of substitutes for oil, conservation of oil, and substitution of other fuels for oil. It would therefore lead to the greatest possible reduction in oil imports (for a given level of tax) and provide the most assistance to domestic producers. An excise tax on foreign and domestic oil would lead to the same reduction in total oil consumption, but would burden rather than encourage domestic oil production, leading to a smaller reduction in oil imports and, therefore, putting less downward pressure on the price charged by foreign producers. A motor fuels tax would lead to a smaller reduction in oil consumption because it would be directed at only one form of oil use and would therefore preclude many oil conservation possibilities. It would also provide no incentives for expanded domestic production. Finally, an ad valorem tax on the consumption of all fuels would lead to energy conservation, but discourage the production of domestic oil as well as all U.S. energy supply sources. These last two taxes, therefore, would do less to reduce world oil prices, encourage a reduction in oil imports, and assist the domestic oil industry.

The U.S. Refining Industry

The two-tiered tariff ($5.00 on crude imports and $10.00 on refined product imports) is of special interest because it would raise consumer prices and domestic refiner and shipping company profits while providing no incentives

for domestic oil exploration and production beyond those offered by a single $5.00 levy on imported crude oil and refined products. Even if domestic refining capacity was sufficient to fulfill domestic needs entirely, this would require using domestic refineries that are older and less efficient than existing capacity.

The East Coast would be at some disadvantage under a two-tiered tariff, since it relies heavily on refined product imports and has very little excess refining capacity of its own. The difference could be supplied from Gulf Coast refineries, but product pipelines from the Gulf Coast have limited capacity and would have to be supplemented by tankers and barges at higher cost. All product shipments among ports in the United States would have to be made on U.S. flag ships, whose rates are already higher than those of foreign ships and are likely to become more so at higher utilization rates.

The most common arguments for two-tiered tariffs are that national security requires a stronger domestic refining industry, and that U.S. refiners suffer a disadvantage in having to pay pollution abatement costs. But the risks posed to national security from oil imports generally concern the threat to supplies of crude oil rather than refined products. A cutoff of refined products from the Persian Gulf--the most severe likely product disruption--would cause minor damage compared with a cessation of crude oil flow from the same countries. In 1985, only 0.4 percent of U.S. consumption of refined products was drawn from Persian Gulf sources, although that share is growing. Even if refining capacity was of paramount importance, a more appropriate response might be to fill part of the Strategic Petroleum Reserve with refined products in place of crude oil.

The other argument advanced for a two-tiered tariff concerns the costs U.S. refiners bear for pollution abatement, and holds that domestic refiners need protection to offset these costs. On net, the costs are much less than the $5.00 per barrel differential found in one version of the proposed tariff--perhaps as low as $0.50 per barrel, if the cost of removing the lead from gasoline to meet U.S. environmental statutes is also included. And even if the pollution abatement costs were higher, there is no precedent for offsetting them by imposing protective tariffs. Indeed, such an offset would encourage pollution.

Finally, like the oil regulations of the 1970s, two-tiered tariffs would encourage the construction of refineries that would be viable only because of federal protection. Half the refining capacity that has shut down since 1981 closed not because it was old, but because it had been built in the 1970s to take advantage of biases in federal regulations (often called the

"small refiners' bias") and could not match the efficiency of internationally oriented refineries on its own terms. After oil was decontrolled, such capacity had to be shut down. This proposal would once again promote the creation of refining capacity dependent on federal protection.

International Cooperation

Oil taxes would have their maximum depressing effect on world crude oil prices if imposed by all or most oil-consuming countries. Acting in concert, these countries could force producers to accept a larger proportion of any oil tax than if the United States acted alone. The result would be a smaller decrease in oil imports and a smaller tax burden.

In fact, other industrialized countries already have higher levels of oil taxes than the United States. Most of these taxes are gasoline taxes; motor fuels taxes are four to ten times higher in these countries. Taxes on other fuels also exist: Japan, for example, has an $18.00 per barrel tax on distillate fuel while the United States has none. Higher energy taxes in these countries reflect their far greater use of sales and consumption taxes as revenue sources. Industry sources note that many of these countries appear prepared to raise their oil taxes again now that world oil prices have fallen.

"Variable Tariffs"

One variant on the oil import tariff, proposed in S. 1997 by Senator Wallop, would set its value according to the difference between the existing world price of oil and some "benchmark" price. In S. 1997, this benchmark price is $22.00 per barrel; thus if oil prices were to stay at $13.00 per barrel, the tariff would equal $9.00 per barrel.

The variable tariff would, in essence, provide a floor price for the domestic oil industry. If oil prices were to rise again next winter or in the next few years, as some analysts believe they will, such a levy would protect the domestic oil industry from a harmful "whipsaw" effect in which some production is forced to close as prices fall and is no longer available when they rise again. The corresponding disadvantage of such a proposal is that it would place an artificial restraint on oil imports that are less expensive than the benchmark price. If oil prices had found their long-term level below the benchmark, the tariff would redistribute income from other industries and regions to domestic oil producers, but would do so only at a cost to economic efficiency. This cost might be sizable, since only a fraction of current domestic oil production is jeopardized by current low prices; a variable

tariff might give other domestic oil producers a subsidy they do not need in order to continue producing. Moreover, if the goal of energy policy is to encourage marginal producers to continue supplying oil now that the price is low, there may be better ways of accomplishing this than a variable tax.

Distributional Issues

At oil prices of $23.00 per barrel, the energy taxes discussed in this paper generally would cost families an average of 0.3 percent of their annual income, or about $85.00 per year at current price levels. Using another measure, these added energy costs would amount to 0.4 percent of their total expenditures. The latter may be a better measure by which to assess the distributional effects of the tax because families usually choose a level of expenditure that reflects their expectations of long-term income.

Measured as a percent of total expenditures, the tax burden would not vary widely for families with different incomes. In absolute terms, at current price levels, the added expenditures would range from about $35.00 per year for families with annual incomes of less than $5,000 to $130 per year for families with annual incomes of $50,000 or more, or from 0.4 percent to 0.3 percent of total expenditures.

Except for the two-tiered tariff, which would require the use of uneconomic refining capacity and place a heavier burden on the Northeast, the increase in energy expenditures would also be roughly the same across regions. In the Northeast, additional energy expenditures under the two-tiered tariff would be about $115 per year at current prices or 0.6 percent of total expenditures, while the rest of the country would spend no more than $82.00 per year or 0.4 percent of total expenditures. At $13.00 per barrel, the two-tiered tariff would penalize Northeast consumers even more, raising their energy costs by $192 per year, more than twice the cost burden imposed by other oil taxes.

CHAPTER I

INTRODUCTION

Proposals have been made to place new taxes on oil as a means of reducing the federal deficit, and for other purposes. [1] This paper analyzes the major features of several types of possible oil taxes: a tariff on imported crude oil and products; an excise tax on domestic and foreign crude oil and imported products; a tax on motor fuels; a broad-based energy tax on oil, natural gas, coal, and electricity; and a combination of an import tariff and a motor fuels tax. The report is intended as a general discussion of these types of taxes; any specific bill could contain features not analyzed in this paper.

The paper first discusses the rationales for energy taxation and presents the major assumptions underlying the analysis. It then analyzes the net budgetary effects of each type of tax. Subsequent chapters discuss energy policy effects, implications for trade and the international economy, and distributional consequences.

RATIONALES FOR OIL TAXES

Beyond their effects on the federal deficit, several arguments have been advanced in favor of oil taxes. These can generally be grouped into three, in which oil taxes are seen as a means to address the risks posed to the United States by uncertain foreign oil supplies; as a device to lower the world price of oil and to break the market power of monopolistic producers; and as an adjustment mechanism to buffer the domestic oil industry from swings in world oil prices.

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1. A number of bills increasing oil taxes have been introduced in the current Congress. Among those receiving the most attention are S. 1507, which would put an import tariff of $5.00 on crude oil and $10.00 on refined products so long as world oil prices were under $25.00 per barrel; S. 1997, which would put an import tariff on imported oil equal to the difference between the world price and $22.00 per barrel; and S. 1412, which would put a $10.00 tariff on imported oil. Other bills include S. 735, H.R. 4117, H.R. 1909, H.R. 1541, and H.R. 1396.

The "Social Costs" of Oil Imports

Some analysts argue that oil consumption involves costs to society that are not measured in prices to the consumer. Foremost among these costs are the risks of becoming dependent upon foreign oil supplies, and the possibility of future dislocations caused by rising oil prices. [2] Since 1979, world oil consumption (outside the centrally planned economies) has declined significantly--from 52 million barrels per day in 1979 to 46 million barrels per day in 1985--so that the ability of any one foreign oil producer or group of producers to disrupt the U.S. and world economies by manipulating the price of oil has substantially declined. [3] At the same time, the importance of oil to the U.S. economy has decreased: in 1981, oil purchases totalled roughly 7 percent of gross national product (GNP), but by 1985 they had fallen to 4 percent of GNP. Moreover, the Strategic Petroleum Reserve (now equal in size to 100 days of imports) makes the U.S. economy more resistant to a disruption. Together these trends suggest that the risks of supply disruptions or price manipulation have declined.

If the risks involved in oil imports have declined, then an increase in energy taxes might unduly penalize the users and producers of oil and related commodities. Other ways of reducing the deficit, such as cuts in federal spending and/or taxes on income or consumption, might be more efficient from an economic viewpoint. But lower oil prices may in the long run have negative effects: they may encourage more U.S. and world oil consumption; discourage oil production in high-cost producing areas, most of which are outside the Organization of Petroleum Exporting Countries (OPEC) and some of which are in the United States; and again concentrate world oil supplies in the low-cost Persian Gulf fields. As shown in Table 1, should oil prices of $13.00 per barrel persist until 1991, U.S. oil imports could rise to over 11.0 million barrels per day. Furthermore, some non-OPEC and non-Persian Gulf OPEC oil sources may begin to face depletion in the next decade. These consequences could lead to a reemergence of the "oil vulnerability" issue. [4]

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2. Congressional Budget Office, *The World Oil Market in the 1980s: Implications for the United States* (May 1980).

3. For 1979 estimates, see Energy Information Administration, *1984 Annual Energy Review* (Washington, D.C.: Government Printing Office, 1985), p. 225. Equally important, the share of countries belonging to the Organization of Petroleum Exporting Countries (OPEC) in this demand has fallen from 31 million barrels per day in 1979 to 17.5 million in 1984, creating considerable excess productive capacity. Ibid., p. 221.

4. It should be noted, however, that policies addressing this future social cost must contend with the fact that their benefits would occur in the next century, while their costs would occur today.

TABLE 1. ASSUMPTIONS AS TO U.S. OIL SUPPLY AND DEMAND AT THREE PRICE LEVELS AND IN THE ABSENCE OF NEW OIL TAXES
(In millions of barrels per day)

Variable	Preliminary 1985	Projected 1986	1987	1988	1989	1990	1991
Oil Price: $23.00 per Barrel							
Demand	15.6	15.8	16.0	16.2	16.3	16.7	17.0
Supply [a]	11.0	11.1	11.1	11.0	10.8	10.7	10.6
Imports [b]	4.6	4.7	4.9	5.3	5.6	6.0	6.4
Oil Price: $18.00 per Barrel							
Demand	--	--	16.8	17.3	17.7	18.2	18.6
Supply [a]	--	--	10.9	10.7	10.5	10.4	10.2
Imports [b]	--	--	5.9	6.5	7.2	7.8	8.4
Oil Price: $13.00 per Barrel							
Demand	--	--	17.9	18.7	19.4	20.1	20.9
Supply [a]	--	--	10.6	10.4	10.1	9.9	9.6
Imports [b]	--	--	7.3	8.3	9.3	10.3	11.3

SOURCE: Congressional Budget Office.

a. Includes natural gas liquids and refinery gain.

b. Includes 0.3 million barrels per day in 1985 for stock adjustment and statistical discrepancy, which are assumed to be zero for later years.

If oil imports are seen as continuing to pose risks for the economy, then some form of oil tax may constitute an appropriate response. Specifically, an oil import tariff set at a level equal to the social "premium" associated with oil consumption would provide a broad signal to energy suppliers and consumers by raising the benchmark price of all energy in the economy. That is, all energy suppliers and consumers would be led to value oil correctly, from a social perspective, once an oil tariff was applied. Energy

taxes that fall upon only U.S. energy production, or upon the consumption of only one oil product, lack this evenhandedness. An oil import tariff might also be an efficient substitute for other incentives for U.S. energy production, such as the preferential tax treatments afforded some energy producers, or federal research programs into energy development or use. 5/

On the other hand, even if a social "premium" exists for oil consumption, taxes to reduce oil imports may not be the best solution so long as the alternative remains of reducing oil imports by allowing markets to work freely. Completing natural gas decontrol and promoting renegotiations to reduce the rigidities of gas contracts and facilitate orderly adjustment in the gas market may be two such options available to the Congress. Electricity production could be made more efficient if its regulation was redesigned, perhaps by allowing unregulated generating units to compete for sales to a central grid. 6/ Thus, in terms of energy policy, the issues before the Congress are whether dependence on foreign oil poses or will pose a threat to the United States, and, if so, whether an oil tax would be the most effective policy for addressing the potential costs of this dependence.

An "Optimal Tariff" on Foreign Monopolists

A second rationale for taxes on oil imports sees them as a way of counteracting a foreign monopolist. Tariffs on imported goods generally place the economy at a disadvantage by forcing it to produce domestically goods and services that could be obtained more advantageously abroad. This is true of goods that are bought and sold in competitive world markets, as most are. But if the producer of the imported goods is a monopolist, or, more broadly, has significant market power, then consumers must pay more for imported goods than the cost of the resources that went into them. The imposition of a tariff on a foreign monopolist's production may be warranted, therefore, if it forces him to lower his price toward the level that would obtain on a competitive market.

Oil production may be a legitimate example of such a case. OPEC is obviously not a competitive oil producer, and earns large monopoly profits on its production since the resource cost of producing much OPEC oil is

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5. It is impossible, of course, to determine how high the tariff would need to be to offset the risk associated with oil consumption. The level of the tariff would be almost arbitrary, since estimates of the risk premium range from $5.00 to $50.00 per barrel.

6. Congressional Budget Office, *Promoting Efficiency in the Electric Utility Sector* (November 1982).

substantially less than its market price. Moreover, a tariff on oil imports might force OPEC to share some of its profits with consumers by lowering the world oil market price. This outcome is essential if a tariff is to increase economic welfare. Unless it drives down foreign prices, an oil tariff will have only the distorting effects associated with tariffs in general.

This rationale must be invoked very cautiously. There is no certainty that a U.S. oil tariff would drive down the world price of oil. Oil producers might instead be induced to limit their production in order to maintain prices. Moreover, the tariff might evoke countermeasures by some producing countries, which could retaliate by restricting their imports of goods from the United States, such as capital goods and farm products. Finally, the imposition of tariffs is always risky. It invokes the sort of "beggar-thy-neighbor" policies that, in the 1930s, led to a virtual breakdown of international trade and senselessly prolonged the Great Depression.

Economic Adjustment

Another goal of an oil tax would be to shield the domestic oil industry from downward swings in the price of oil. The swift decline in oil prices since the beginning of the year has caused hardship throughout the industry. Exploration budgets have been slashed, drilling rigs are idle, and personnel are being laid off. Some wells are closing never to be reopened. The state governments of Texas, Louisiana, and Oklahoma are all facing fiscal crises of enormous proportions, since the bulk of their revenue comes from royalty payments, severence taxes, and other oil-based revenue sources. Unless other revenues are found, public services will have to be curtailed. These somewhat localized effects of lower oil prices could be felt on a national scale through the banking system. Many of the banks in the Southwest have significant oil investments. A massive writing down of these investments could precipitate runs on some banks that would create difficulties in turn for money center banks and banks in other regions.

Hardships such as these are not unique to the oil industry. Other U.S. industries have faced falling prices and excess capacity. City and state governments that depend on the health of those industries have lost revenue and been obliged to make the kinds of choices the oil states are now making. The automobile and steel industries have undergone contractions that were comparable to those the oil industry is now facing.

Moreover, not all segments of the oil industry are being hurt by the oil price decline. The oil price rises of the 1970s resulted in more employment

in the production end of the oil industry, but in an absolute reduction in the number of jobs in refining and distribution. 7/ If oil price declines encourage more consumption, then the distribution and refining ends of the industry should see employment increases. Employment in the production end of the oil business (oil field machinery, oil mining, and oil and gas field services) has been declining since 1981, and the gains in employment that have come to the oil industry since then have all been in wholesale and retail distribution. On the other hand, it is unlikely that the gains in employment in refining and distribution will come about as rapidly as the loss of employment in the production-oriented segment of the oil industry should oil prices remain at their current levels.

One problem unique to the oil industry is the vulnerable position of many major banks. Many banks made loans to cover equipment and drilling expenses, and these loans may not be collectible. Without some relief, such banks may lose a significant fraction of their net worth and/or experience a run. Oil asset prices have been eroding for a long time, however, giving banks some advance warning. A major question is whether a tax or import tariff is the appropriate mechanism to deal with the risks posed by a group of problem banks. The recent experience of federal banking agencies in dealing with problem banks suggests other avenues for adjustment.

It should also be pointed out that most oil taxes would not help the industry. Only an oil import tariff would do so, by raising domestic oil prices. Other taxes would divert the income stream to the federal government, worsening the situation for oil producers.

MAJOR ASSUMPTIONS OF THE ANALYSIS

This analysis estimates the net budgetary effects of a variety of oil taxes. Such estimates depend critically on underlying assumptions. The most important assumptions made concern changes in macroeconomic variables, the response of OPEC producers, and the quantities of domestic oil that would be produced and consumed in the absence of an oil tax.

7. See Congressional Budget Office, *Understanding Natural Gas Price Decontrol* (April 1983), p. 49. For updated employment figures, see Bureau of Labor Statistics, *Supplement to Employment and Earnings* (June 1985).

Macroeconomic Effects

When estimating the revenue effects of various tax alternatives, the Congressional Budget Office, like most other analytic agencies and institutions, employs the assumption that nominal GNP--that is, GNP expressed in current dollars uncorrected for inflation--remains constant before and after the imposition of the tax. This assumption is made because the macroeconomic effects of tax changes are complex and often uncertain, and to incorporate these effects into estimates of the revenue gains or losses associated with different taxes would add an unreasonable degree of uncertainty.

Moreover, the assumption that nominal GNP remains the same after changes in tax policy is a plausible one, particularly when changes in income taxation are considered. Higher taxes have the potential to reduce GNP in the short term, since higher taxes leave households with less income to spend and also distort their economic incentives. But other, positive effects also occur as taxes rise and the federal deficit is correspondingly lowered. Interest rates may fall, allowing interest-sensitive sectors of the economy to expand more rapidly. Lower interest rates would also reduce net inflows of foreign capital into the United States, which would allow the dollar exchange rate to fall and the U.S. trade balance to improve. In fact, in an open and competitive world economy, changes in the federal deficit might affect the composition of economic activity more than its level: lower deficits in general appear to encourage production, exports, and--most crucially--investment.

Excise taxes, such as the oil taxes discussed in this report, are a special case, since they are targeted at one commodity as opposed to the broader base of income taxes. The fact that oil taxes are aimed at one commodity means that they inherently distort the relative prices of different goods in the economy. This distortion compromises the economy's efficiency--it requires producers and consumers to react to a set of prices that distort underlying economic costs. In this case, consumers would be led to use less oil than the cost of producing and acquiring it would suggest as optimal. Moreover, the economy would be forgoing seemingly less expensive opportunities to purchase foreign oil and substituting for them more expensive domestic production. This loss of efficiency suggests that oil taxes would have a more negative effect on the economy per dollar of revenue raised than would a general increase in a tax with a broader base.

But, as discussed above, oil taxes could lead to a lower world price of oil. If they did, the taxes would in effect be paid in part by foreign oil producers. The decline in world oil prices would represent a transfer of income from foreigners to the United States, an unambiguously positive

result. The magnitude of this income transfer is uncertain, but it could offset, in whole or in part, the efficiency losses traditionally associated with excise taxes and tariffs.

An important implication of the convention that nominal GNP remains approximately unchanged after the imposition of an energy tax is that the gross receipts collected from an oil tax are not equal to the net revenue effect of the tax. Oil taxes yield positive revenue, but if nominal GNP is constant this requires that incomes elsewhere in the economy decline by just the amount of the tax. The analysis assumes, therefore, that any new cost burden created by an oil tax results in equivalent losses of business and personal income that would have been taxed at some aggregate marginal tax rate (here assumed to be 25 percent, the same rate at which any new corporate or personal income resulting from an oil duty is taxed). Thus, if an oil import tariff raises domestic oil costs as it raises revenues, the increase in domestic costs will result in lower income, and lower tax payments, elsewhere in the economy. Conversely, if a gasoline tax lowers world oil prices, and, in turn, the price received by domestic oil producers, then gross motor fuels tax receipts will be offset by the reduced income tax paid by domestic oil and gas producers.

Response of Foreign Producers

An excise tax (or a tariff) on a good produced abroad further complicates the analysis. Unless foreign producers of the good act to curb their output, its world price will fall. This is because U.S. consumers, through interfuel substitution and conservation, will reduce their purchases of oil, including imported oil. Foreign oil producers will then face a choice between reducing their output to maintain world market prices and maintaining their output while allowing prices to fall. How they respond will help to determine who bears the burden of the tax. Any oil tax will have this consequence because all taxes, though in differing degree, will reduce the quantity of foreign oil demanded.

In a competitive market, the division of the burden of any excise tax between producers and consumers depends on supply and demand responses to price changes. The international oil market, however, is characterized by major noncompetitive elements. Consequently, the supply response to oil price changes depends heavily on policies of major producing countries, particularly Saudi Arabia and other members of OPEC. During periods of OPEC strength, producers attempted to shift the entire price change to consumers through output reduction. Recently OPEC, and in particular Saudi, policy appears to have changed. Major OPEC producers now seem to

be less concerned, or less able, to defend the world price and more oriented toward preserving their market share. For this reason, this analysis assumes that producers would not adjust their output levels in response to an oil tax by enough to maintain a constant world price. Instead, they might absorb a significant portion of the tax.

The amount of the tax absorbed by foreign producers would depend on the extent to which the demand for imported oil declined in response to the particular tax--the greater the extent to which any tax reduces the demand for imported oil, the more it forces foreign producers to accept lower prices for the oil they wish to sell. If world oil prices declined in response to taxes, the result would be a gain in real income for oil consumers both at home and abroad. CBO assumes, on the basis of rough calculations of domestic and foreign supply and demand responses, that foreign producers would absorb approximately 37 percent of any import tariff and 33 percent of an oil excise tax. They would absorb more of the import tariff because such a tax allows domestic oil production to rise (and the demand for imported oil to fall) while an oil excise tax does not. Similarly, foreign producers would absorb 17 percent of the per barrel value of a broad-based energy tax. The lower percentage obtains because an energy tax would raise the prices of oil substitutes as well as of oil, thus limiting the possibilities for interfuel substitution, and would discourage the domestic production of other fuels. Thus the decline in U.S. demand for imported oil would be smaller with the energy tax than with either oil tax. Foreign producers would absorb a smaller share--13 percent--of an increase in motor fuels taxes. This smaller proportion reflects the fact that a motor fuels tax is imposed on a more limited base than an oil tax and, therefore, precludes many possibilities for reductions in oil demand, while providing no new incentives for fuel supply. Moreover, short-term gasoline demand depends strongly on the characteristics of the automotive vehicle fleet, which change little in the short term. The combination import/motor fuels tax described below would force foreign producers to absorb approximately 25 percent of the per barrel value of such a tax.

All of these estimates involve considerable uncertainty because of the difficulty of assuming just how producers would respond to various taxes. 8/ If taken as an affront, oil taxes could provoke retaliatory action. Moreover, given the rate of change currently occurring in the oil markets, it is not clear whether the conditions of supply and demand will remain constant in the future. In short, these effects should be taken as illustrative of the level of producer absorption that might be expected.

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8. For a similar analysis, see *PEMEX Information Bulletin*, March 1986.

59-536 O - 86 - 3

Oil Consumption, Production, and Import Assumptions

Given the substantial uncertainty underlying future world oil prices, this analysis calculates revenues for all tax alternatives under three oil price assumptions: constant nominal oil prices (average refiners' acquisition cost) of $23.00 per barrel, $18.00 per barrel, and $13.00 per barrel.[9] In the $23.00 per barrel case, domestic oil consumption is assumed to rise from 16.0 million barrels per day in calendar year 1987 to 17.0 million barrels per day in 1991. Crude oil and refined product imports rise from 5.5 million barrels per day in 1987 to 7.0 million barrels per day in 1991. At the other extreme, given oil prices of $13.00 per barrel, oil imports rise from 7.9 million barrels per day in 1987 to 11.9 million barrels per day in 1991. (See Table 1.) The prices and quantities of natural gas and coal are assumed to change with oil prices. The revenues generated by the crude oil windfall profit tax would also change: at $23.00 per barrel, the windfall profits tax would lead to net federal revenues, while at $13.00 per barrel, no windfall profit tax would be collected.

The analysis also assumes that Strategic Petroleum Reserve (SPR) acquisitions would not be subject to any of the taxes, so that SPR costs would change only with the world price of oil. The use of oil tax receipts to finance SPR purchases is discussed below.

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9. These price paths and the corresponding consumption levels do not correspond to the CBO baseline forecast. For this and other reasons, these estimates differ from those appearing in *Reducing the Deficit: Spending and Revenue Options* (March 1986).

CHAPTER II

OIL TAXES AND THE FEDERAL BUDGET

This chapter presents estimates of the effects of oil taxes on the federal budget. [1] The estimates include the additional revenue that would be raised directly by the oil taxes, and also by the crude oil windfall profit tax where appropriate, as well as the reduction in revenue from corporate and personal income taxes that would occur as other prices changed in the economy. The estimates reflect changes that would occur in the demand and domestic supply of oil and other fuels as the prices confronting consumers and producers of those fuels changed.

OIL TAX OPTIONS

Among the tax options most frequently discussed are an import tariff, an excise tax, a motor fuels tax, and a broad-based energy tax (sometimes called a Btu tax). [2]

Oil Import Tariff

A $5.00 per barrel tariff would be imposed on all imported crude oil, and a tariff of $10.00 per barrel on imported petroleum products. An extra $5.00 per barrel on imported products would be sufficient to prevent their importation, since enough domestic refining capacity exists to meet demand (given the tariff penalty) at $23.00 and $18.00 per barrel. Thus, this analysis assumes that imports of crude oil would be substituted for all imports of refined products at $23.00 and $18.00 per barrel, so that the revenue

1. The estimates presented in this analysis are not comparable with estimates in previous CBO studies. They are based on different assumptions as to oil price levels and employ a different methodology. They also reflect updated assumptions regarding consumption and production, tax rates, and other variables. The methods used in formal revenue estimates can be found in Congressional Budget Office, *Reducing the Deficit: Spending and Revenue Options* (March 1986), p. 232. For the purpose of administering the budget process, baseline assumptions would be used in scoring the revenue implications of new energy taxes.

2. While such a tax is not strictly an oil tax, it is usually discussed in this context because it would contribute to revenues and to energy security.

effects of this proposal are identical to a $5.00 tariff on imported crude and products at the two higher price levels. At $13.00, consumption of refined petroleum products would become large enough to require imports, and the added tariff on imported refined products would yield added revenues.

Taxes that increase domestic crude oil and natural gas prices will increase federal royalties from oil and natural gas production from the outer continental shelf and onshore federal and Indian lands, and increase receipts from the sale of the Naval Petroleum Reserve. On the other hand, the federal government consumes roughly 500,000 barrels of refined petroleum products per day. 3/ It is assumed that outlays would increase to cover the added costs of this consumption.

Oil Excise Tax

A $5.00 per barrel tax would be imposed on all crude oil (both foreign and domestic) used by refineries and an equivalent tax would be imposed on all imported refined petroleum products. Because of the competition posed by refined product imports, U.S. refiners would not be able to increase their margins, and higher crude costs would be passed forward equally to all products.

Motor Fuels Tax

The motor fuels excise tax would be increased by 12 cents per gallon ($5.04 per barrel). The tax would be similar to the motor fuels tax that finances the Highway Trust Fund, but revenue would not be dedicated to the fund. Gasoline and diesel fuels would be subject to the tax. All current exemptions, such as those for alcohol fuels or off-road uses (primarily in agriculture), would be continued.

Broad-based Energy Tax

The broad-based energy tax would be an ad valorem tax on oil, natural gas, coal, and electricity, equal to 5 percent of the final sale price of each. An equivalent tax would be placed on all imports of these energy sources. At

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3. Energy Information Administration, *1984 Annual Energy Review* (Washington, D.C.: Government Printing Office, 1985), p. 21. Not all of this oil is purchased from domestic sources. Consequently, the estimates in this report overstate the additional outlays that would result from an import tariff.

an oil price of $23.00 per barrel, the energy tax would initially be equal to 4 cents per gallon of gasoline, $0.22 per thousand cubic feet of natural gas, $1.74 per ton of coal, and 0.4 cent per kilowatt hour of electricity. At an oil price of $18.00 per barrel, the energy tax would be equal to 4 cents per gallon of gasoline, $0.20 per thousand cubic feet of natural gas, $1.69 per ton of coal, and 0.3 cent per kilowatt hour. At an oil price of $13.00 per barrel, the energy tax would be equal to 3 cents per gallon of gasoline, $0.19 per thousand cubic feet of natural gas, $1.65 per ton of coal, and 0.3 cent per kilowatt hour.

Combination of Taxes

Refined product and crude oil taxes could be combined in many ways, but this report assumes a $2.50 per barrel oil import tariff combined with a 6 cent per gallon motor fuels tax. The import tariff component is assumed to be spread evenly across all products by refiners. [4]

EFFECTS ON THE BUDGET

The net budgetary effects of the tax alternatives defined above are presented in Table 2, for each of the three oil price assumptions. In Table 3, the budgetary effects are presented from a different perspective--the level of each tax required to achieve a cumulative deficit reduction of $25 billion, $50 billion, or $75 billion in the five years following enactment. All the taxes are assumed to take effect on July 1, 1986. Under the revenue estimating conventions described earlier, no allowance is made for different levels of taxes having different macroeconomic effects. Note that even a revenue gain of $75 billion amounts to less than 0.3 percent of cumulative GNP over the five-year period. (The reader is referred to Chapter I for a more complete discussion of the major economic assumptions underlying the estimates.)

Oil Import Tariff

A tariff of $5.00 per barrel on imported crude oil and a $10.00 tariff on imported refined products would lead to a net deficit reduction of $8.9 billion in 1987 if oil prices remained at $13.00 per barrel, a reduction of

4. This is a simplifying assumption in that, under this combination of taxes, motor fuels consumers would experience price increases larger than those experienced by consumers of other petroleum products, and their demand response could force refiners to shift output from motor fuels to other products.

TABLE 2. NET DEFICIT REDUCTION UNDER FIVE OIL TAX ALTERNATIVES
(By fiscal year, in billions of current dollars)

Tax Alternative	1987	1988	1989	1990	1991
Pre-tax Oil Price: $23.00 per Barrel					
Import Tariff	8.1	8.3	8.6	8.8	9.0
Excise Tax	22.1	22.5	23.0	23.2	23.5
Motor Fuels Tax	8.8	8.9	9.1	9.1	9.3
Energy Tax	15.1	15.6	16.2	16.6	17.1
Combination of Taxes	8.6	8.7	9.0	9.2	9.6
Pre-tax Oil Price: $18.00 per Barrel					
Import Tariff	8.2	8.8	9.3	10.0	10.5
Excise Tax	24.0	24.6	25.1	25.5	26.0
Motor Fuels Tax	9.0	9.1	9.2	9.3	9.5
Energy Tax	14.1	14.5	15.2	15.7	16.2
Combination of Taxes	9.2	9.5	10.0	10.4	11.0
Pre-tax Oil Price: $13.00 per Barrel					
Import Tariff	8.9	9.9	10.6	11.5	12.2
Excise Tax	25.4	26.3	27.1	27.8	28.5
Motor Fuels Tax	9.2	9.2	9.3	9.3	9.5
Energy Tax	13.0	13.5	14.2	14.8	15.3
Combination of Taxes	10.1	10.8	11.5	12.2	13.0

SOURCE: Congressional Budget Office.

NOTES: *Import Tariff*: $5.00 per barrel imposed on crude oil and $10.00 per barrel on refined products.

Excise Tax: $5.00 per barrel imposed on all domestic and foreign crude oil and refined products.

Motor Fuels Tax: 12 cents per gallon ($5.04 per barrel) on all motor fuels.

Energy Tax: Ad valorem tax of 5 percent of final sale value of domestic and imported oil, natural gas, coal, and electricity.

Combination of Taxes: $2.50 per barrel on imported oil and 6 cents per gallon on motor fuels.

TABLE 3. APPROXIMATE TAX LEVELS NECESSARY TO ACHIEVE FIVE-YEAR NET DEFICIT REDUCTION LEVELS, FISCAL YEARS 1987-1991

Tax Alternative	Five-Year Deficit Reduction Target		
	$25 billion	$50 billion	$75 billion
Pre-tax Oil Price: $23.00 per Barrel			
Import Tariff (dollars per barrel)	3.00	6.00	9.00
Excise Tax (dollars per barrel)	1.10	2.20	3.30
Motor Fuels Tax (cents per gallon)	6.7	13.3	20.0
Energy Tax (percent of value)	1.6	3.2	4.8
Combination of Taxes (dollars per barrel/	1.40	2.80	4.20
cents per gallon)	3.3	6.7	10.0
Pre-tax Oil Price: $18.00 per Barrel			
Import Tariff (dollars per barrel)	2.70	5.30	8.00
Excise Tax (dollars per barrel)	1.00	2.00	3.00
Motor Fuels Tax (cents per gallon)	6.5	13.0	20.0
Energy Tax (percent of value)	1.7	3.3	5.0
Combination of Taxes (dollars per barrel/	1.40	2.50	3.75
cents per gallon)	3.3	6.0	9.0
Pre-tax Oil Price: $13.00 per Barrel			
Import Tariff (dollars per barrel)	2.40	4.80	7.10
Excise Tax (dollars per barrel)	0.93	1.85	2.80
Motor Fuels Tax (cents per gallon)	6.5	12.9	20.0
Energy Tax (percent of value)	1.8	3.5	5.3
Combination of Taxes (dollars per barrel/	1.09	2.20	3.25
cents per gallon)	2.6	5.2	7.8

SOURCE: Congressional Budget Office.

$8.2 billion at oil prices of $18.00 per barrel, or a reduction of $8.1 billion at oil prices of $23.00 per barrel. The five-year deficit reduction achieved by such a tax would be $42.9 billion, $46.8 billion, and $53.1 billion at oil prices of $23.00, $18.00, and $13.00 per barrel, respectively. Table 4 presents these estimates in greater detail. An oil tariff would raise revenue through

TABLE 4. NET DEFICIT REDUCTION UNDER AN OIL IMPORT TARIFF OF $5.00 PER BARREL ON CRUDE OIL AND $10.00 PER BARREL ON REFINED PRODUCTS UNDER ALTERNATIVE OIL PRICE ASSUMPTIONS
(By fiscal year, in billions of current dollars)

Revenues and Outlays	1987	1988	1989	1990	1991
Pre-tax Oil Price: $23.00 per Barrel					
Revenues					
Gross tariff receipts	8.3	8.8	9.3	9.8	10.3
Increased windfall profit tax	1.9	1.5	1.3	1.0	0.8
Total offsets	(1.8)	(1.8)	(1.8)	(1.8)	(1.8)
Net revenue increase	8.4	8.6	8.9	9.0	9.2
Outlays					
Increased federal energy costs	0.6	0.6	0.6	0.6	0.6
Offsetting receipts	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)
Net outlay increase	0.2	0.2	0.2	0.2	0.2
Net Deficit Reduction	8.1	8.3	8.6	8.8	9.0
Pre-tax Oil Price: $18.00 per Barrel					
Revenues					
Gross tariff receipts	9.4	10.3	11.2	12.0	12.8
Increased windfall profit tax	0.7	0.5	0.2	0.1	a/
Total offsets	(1.7)	(1.7)	(1.8)	(1.9)	(2.0)
Net revenue increase	8.4	9.0	9.3	10.2	10.8
Outlays					
Increased federal energy costs	0.6	0.6	0.6	0.6	0.6
Offsetting receipts	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)
Net outlay increase	0.2	0.2	0.2	0.2	0.2
Net Deficit Reduction	8.2	8.8	9.3	10.0	10.5
Pre-tax Oil Price: $13.00 per Barrel					
Revenues					
Gross tariff receipts	10.8	11.9	12.8	14.0	14.8
Increased windfall profit tax	0.0	0.0	0.0	0.0	0.0
Total offsets	(1.7)	(1.8)	(2.0)	(2.2)	(2.3)
Net revenue increase	9.1	10.1	10.8	11.8	12.4
Outlays					
Increased federal energy costs	0.6	0.6	0.6	0.6	0.6
Offsetting receipts	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)
Net outlay increase	0.2	0.2	0.2	0.2	0.2
Net Deficit Reduction	8.9	9.9	10.6	11.5	12.2

SOURCE: Congressional Budget Office.

NOTE: Numbers may not add because of rounding.

a. Less than $50 million.

three avenues: tariff receipts, higher windfall profit tax payments by domestic oil producers, and increases in corporate income taxes paid by domestic producers of oil and gas. Domestic crude oil prices would rise in response to an oil tariff. The windfall profit tax would take a portion of this price increase. The remaining added profits of domestic oil producers and domestic gas producers would be taxed as corporate income.

These revenue increases would be offset by reduced corporate profits and personal incomes elsewhere, as higher energy prices raised business costs and reduced the income available for consumption of other goods and services. The additional $5.00 imposed on imported products would not raise new revenues at price levels of $23.00 and $18.00 per barrel because no products would be imported. It would, however, raise the cost of refined products, as uneconomic U.S. refinery capacity was brought into production. At $13.00 per barrel, some additional duty would be collected on refined product imports.

Oil Excise Tax

A $5.00 per barrel excise tax on all crude oil, domestic and imported, and on imported products would reduce the federal deficit by $25.4 billion in fiscal year 1987 if oil prices remained at $13.00 per barrel, by $24.0 billion at oil prices of $18.00 per barrel, or by $22.1 billion at oil prices of $23.00 per barrel. The five-year deficit reduction achieved by such a tax would be $114.3 billion, $125.2 billion, and $135.1 billion at oil prices of $23.00, $18.00, and $13.00 per barrel, respectively. Table 5 shows these estimates in greater detail.

Motor Fuels Tax

A motor fuels tax of 12 cents per gallon would reduce the federal deficit by $9.2 billion in fiscal year 1987 if oil prices remained at $13.00 per barrel, or by $9.0 billion at oil prices of $18.00 per barrel or $8.8 billion at oil prices of $23.00 per barrel. The five-year deficit reduction achieved by such a tax would be $45.2 billion, $46.0 billion, and $46.5 billion at oil prices of $23.00, $18.00, and $13.00 per barrel, respectively. Table 6 gives these estimates in greater detail.

TABLE 5. NET DEFICIT REDUCTION UNDER A $5.00 OIL EXCISE TAX UNDER ALTERNATIVE OIL PRICE ASSUMPTIONS
(By fiscal year, in billions of current dollars)

Revenues and Outlays	1987	1988	1989	1990	1991
Pre-tax Oil Price: $23.00 per Barrel					
Revenues					
Gross tax receipts	28.6	28.9	29.2	29.4	29.6
Total offsets	(5.5)	(5.4)	(5.3)	(5.2)	(5.2)
Net revenue increase	23.0	23.5	23.9	24.2	24.4
Outlays					
Increased federal energy costs	0.6	0.6	0.6	0.6	0.6
Offsetting receipts	0.3	0.3	0.3	0.3	0.3
Net outlay increase	0.9	0.9	0.9	0.9	0.9
Net Deficit Reduction	22.1	22.5	23.0	23.2	23.5
Pre-tax Oil Price: $18.00 per Barrel					
Revenues					
Gross tax receipts	29.8	30.5	31.1	31.6	32.1
Total offsets	(5.1)	(5.1)	(5.2)	(5.3)	(5.4)
Net revenue increase	24.7	25.4	25.9	26.3	26.7
Outlays					
Increased federal energy costs	0.6	0.6	0.6	0.6	0.6
Offsetting receipts	0.2	0.2	0.2	0.2	0.2
Net outlay increase	0.8	0.8	0.8	0.8	0.8
Net Deficit Reduction	24.0	24.6	25.1	25.5	26.0
Pre-tax Oil Price: $13.00 per Barrel					
Revenues					
Gross tax receipts	31.5	32.5	33.5	34.3	35.1
Total offsets	(5.3)	(5.4)	(5.6)	(5.8)	(5.9)
Net revenue increase	26.2	27.1	27.9	28.6	29.2
Outlays					
Increased federal energy costs	0.6	0.6	0.6	0.6	0.6
Offsetting receipts	0.2	0.2	0.2	0.2	0.2
Net outlay increase	0.8	0.8	0.8	0.8	0.8
Net Deficit Reduction	25.4	26.3	27.1	27.8	28.5

SOURCE: Congressional Budget Office.

NOTE: Numbers may not add because of rounding.

TABLE 6. NET DEFICIT REDUCTION UNDER A 12 CENTS PER GALLON MOTOR FUELS TAX UNDER ALTERNATIVE OIL PRICE ASSUMPTIONS
(By fiscal year, in billions of current dollars)

Revenues and Outlays	1987	1988	1989	1990	1991
Pre-tax Oil Price: $23.00 per Barrel					
Revenues					
Gross tax receipts	11.9	11.9	12.1	12.2	12.4
Total offsets	(3.1)	(3.1)	(3.1)	(3.1)	(3.2)
Net revenue increase	8.8	8.8	9.0	9.1	9.3
Outlays					
Decreased federal energy costs	0.1	0.1	0.1	0.1	0.1
Offsetting receipts	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)
Net outlay decrease	0.0	0.1	0.1	0.1	0.1
Net Deficit Reduction	8.8	8.9	9.1	9.1	9.3
Pre-tax Oil Price: $18.00 per Barrel					
Revenues					
Gross tax receipts	12.0	12.0	12.2	12.3	12.5
Total offsets	(3.1)	(3.0)	(3.0)	(3.1)	(3.1)
Net revenue increase	9.0	9.0	9.1	9.2	9.4
Outlays					
Decreased federal energy costs	0.1	0.1	0.1	0.1	0.1
Offsetting receipts	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)
Net outlay decrease	0.1	0.1	0.1	0.1	0.1
Net Deficit Reduction	9.0	9.1	9.2	9.3	9.5
Pre-tax Oil Price: $13.00 per Barrel					
Revenues					
Gross tax receipts	12.2	12.2	12.3	12.4	12.6
Total offsets	(3.0)	(3.0)	(3.1)	(3.1)	(3.1)
Net revenue increase	9.2	9.1	9.2	9.3	9.5
Outlays					
Decreased federal energy costs	0.1	0.1	0.1	0.1	0.1
Offsetting receipts	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)
Net outlay decrease	0.1	0.1	0.1	0.1	0.1
Net Deficit Reduction	9.2	9.2	9.3	9.3	9.5

SOURCE: Congressional Budget Office.

NOTE: Numbers may not add because of rounding.

Energy Tax

An energy tax set equal to 5 percent of the final sale price of domestic crude oil, natural gas, coal, and electricity, with an equivalent tax placed on imports, would decrease the federal deficit by $13.0 billion in fiscal year 1987 if oil prices remained at $13.00 per barrel, by $14.1 billion at oil prices of $18.00 per barrel, or by $15.1 billion at oil prices of $23.00 per barrel. These estimates are presented in Table 7. The five-year deficit reduction achieved by such a tax would be $80.6 billion, $75.6 billion, and $70.9 billion at oil prices of $23.00, $18.00, and $13.00 per barrel, respectively.

Combination of Taxes

A combination of a $2.50 per barrel import tariff and a 6 cent motor fuels tax would increase net federal revenues by $10.1 billion in fiscal year 1987 if oil prices remained at $13.00 per barrel, by $9.2 billion at oil prices of $18.00 per barrel, or by $8.6 billion at oil prices of $23.00 per barrel. Table 8 presents these estimates in greater detail. The five-year deficit reduction achieved by such a tax would be $45.2 billion, $50.0 billion, and $57.6 billion at oil prices of $23.00, $18.00, and $13.00 per barrel.

TABLE 7. NET DEFICIT REDUCTION UNDER A 5 PERCENT AD VALOREM TAX ON DOMESTIC ENERGY CONSUMPTION UNDER ALTERNATIVE OIL PRICE ASSUMPTIONS
(By fiscal year, in billions of current dollars)

Revenues and Outlays	1987	1988	1989	1990	1991
Pre-tax Oil Price: $23.00 per Barrel					
Revenues					
Gross tax receipts	20.7	21.2	22.0	22.7	23.3
Total offsets	(5.2)	(5.3)	(5.5)	(5.7)	(5.8)
Net revenue increase	15.5	15.9	16.5	17.0	17.1
Outlays					
Increased federal energy costs	0.4	0.4	0.4	0.4	0.4
Offsetting receipts	a/	a/	a/	a/	a/
Net outlay increase	0.4	0.4	0.4	0.4	0.4
Net Deficit Reduction	15.1	15.6	16.2	16.6	17.1
Pre-tax Oil Price: $18.00 per Barrel					
Revenues					
Gross tax receipts	19.2	19.8	20.7	21.4	22.1
Total offsets	(4.8)	(4.9)	(5.2)	(5.3)	(5.5)
Net revenue increase	14.4	14.8	15.5	16.0	16.5
Outlays					
Increased federal energy costs	0.3	0.3	0.3	0.3	0.3
Offsetting receipts	a/	a/	a/	a/	a/
Net outlay increase	0.3	0.3	0.3	0.3	0.3
Net Deficit Reduction	14.1	14.5	15.2	15.7	16.2
Pre-tax Oil Price: $13.00 per Barrel					
Revenues					
Gross tax receipts	17.8	18.4	19.3	20.1	20.8
Total offsets	(4.4)	(4.6)	(4.8)	(5.0)	(5.2)
Net revenue increase	13.3	13.8	14.5	15.1	15.6
Outlays					
Increased federal energy costs	0.3	0.3	0.3	0.3	0.3
Offsetting receipts	a/	a/	a/	a/	a/
Net outlay increase	0.3	0.3	0.3	0.3	0.3
Net Deficit Reduction	13.0	13.5	14.2	14.8	15,3

SOURCE: Congressional Budget Office.

NOTE: Numbers may not add because of rounding.

a. Less than $50 million.

TABLE 8. NET DEFICIT REDUCTION UNDER A COMBINATION OF A $2.50 OIL IMPORT TARIFF AND A 6 CENT PER GALLON MOTOR FUELS TAX UNDER ALTERNATIVE OIL PRICE ASSUMPTIONS
(By fiscal year, in billions of current dollars)

Revenues and Outlays	1987	1988	1989	1990	1991
Pre-tax Oil Price: $23.00 per Barrel					
Revenues					
Gross tax receipts	10.2	10.5	10.9	11.3	11.7
Increased windfall profit tax	0.7	0.4	0.4	0.2	0.2
Total offsets	(2.2)	(2.2)	(2.2)	(2.2)	(2.3)
Net revenue increase	8.7	8.8	9.1	9.3	9.6
Outlays					
Increased federal energy costs	0.2	0.2	0.2	0.2	0.2
Offsetting receipts	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)
Net outlay increase	0.1	0.1	0.1	0.1	0.1
Net Deficit Reduction	8.6	8.7	9.0	9.2	9.6
Pre-tax Oil Price: $18.00 per Barrel					
Revenues					
Gross tax receipts	11.3	11.8	12.3	12.9	13.5
Increased windfall profit tax	0.2	0.1	a/	a/	a/
Total offsets	(2.2)	(2.3)	(2.3)	(2.4)	(2.5)
Net revenue increase	9.3	9.6	10.0	10.5	11.1
Outlays					
Increased federal energy costs	0.2	0.2	0.2	0.2	0.2
Offsetting receipts	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)
Net outlay increase	0.1	0.1	0.1	0.1	0.1
Net Deficit Reduction	9.2	9.5	10.0	10.4	11.0
Pre-tax Oil Price: $13.00 per Barrel					
Revenues					
Gross tax receipts	12.5	13.3	14.1	15.0	15.9
Increased windfall profit tax	0.0	0.0	0.0	0.0	0.0
Total offsets	(2.3)	(2.4)	(2.5)	(2.7)	(2.8)
Net revenue increase	10.2	10.8	11.6	12.3	13.1
Outlays					
Increased federal energy costs	0.2	0.2	0.2	0.2	0.2
Offsetting receipts	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)
Net outlay increase	0.1	0.1	0.1	0.1	0.1
Net Deficit Reduction	10.1	10.8	11.5	12.2	13.0

SOURCE: Congressional Budget Office.

NOTE: Numbers may not add because of rounding.

a. Less than $50 million.

CHAPTER III

OIL TAXES AND ENERGY POLICY

Beyond their budgetary impact, oil taxes would have important effects on the level of oil imports, the domestic producing and refining industries, and the output of competing fuels such as coal and natural gas. These and other energy policy considerations are the subject of this chapter.

EFFECTS OF OIL TAXES ON THE LEVEL OF OIL IMPORTS

Oil import reductions resulting from taxes would be larger at lower oil prices. (All of the oil import reduction estimates presented in this section are approximate, and depend on certain assumptions regarding demand and supply elasticities. While the absolute levels of oil import reductions are therefore uncertain, the various options can be ranked in terms of their effects with some confidence.) At oil prices of $23.00 per barrel, 1987 U.S. oil imports would decline by roughly 400,000 barrels per day under an oil import tariff, by around 300,000 barrels per day under an oil excise tax, by perhaps 100,000 barrels per day under a motor fuels tax, by 100,000 barrels per day under an energy tax, and by 100,000 barrels per day under a combination of an import tariff and a motor fuels tax. At oil prices of $18.00 per barrel, using the same elasticity assumptions, oil imports would decline by 600,000 barrels per day under an import tariff, by 400,000 barrels per day under an excise tax, by 100,000 barrels per day under a motor fuels tax, by less than 100,000 barrels per day under an energy tax, and by 200,000 barrels per day under a combination import tariff motor fuels tax. Correspondingly, at oil prices of $13.00 per barrel, imports would decline by 900,000 barrels per day under a tariff, by 500,000 barrels per day under an excise tax, by 100,000 barrels per day under a motor fuels tax, by 300,000 barrels per day under an energy tax, and by less than 100,000 barrels per day under a combination import tariff/motor fuels tax.

Oil Demand Effects

A tax that raised the prices of most oil and oil products, as would an import tariff or an oil excise tax, would be likely to have a stronger impact on oil consumption than would a motor fuels tax or a broad-based energy tax that

produced equal amounts of revenue. A tax that directed the entire tax burden to one commodity, such as gasoline, would limit significantly the inexpensive possibilities for conservation and fuel substitution. Broader-based taxes, in contrast, would offer a wider range of possibilities for reducing oil demand.

The long-term response to such taxes is usually greater than the short-term, since over the longer period energy-using capital, like the vehicle fleet or the stock of housing structures, can adjust to higher prices. But long-run effects depend on the expectations of consumers. If taxes are viewed as a temporary revenue raising measure, consumers are less likely to invest heavily in oil conservation by buying new capital equipment and more fuel-efficient autos, or by switching fuels. The quantity of fuel saved, therefore, will be less than if oil taxes are viewed as permanent. In the latter case, savings in oil consumption will increase over time.

Oil Supply Effects

The United States has a disproportionate share of the world's high-cost oil. For this reason, a tariff could reverse some of the production decline that will occur if prices remain near $13.00 per barrel or lower. A large fraction of U.S. oil production comes from stripper wells--that is, wells that produce less than ten barrels per day. Their high costs and low revenue mean that when prices fall it often becomes uneconomic to maintain them. These wells are often run until additional maintenance is required, at which time they are abandoned and sealed permanently. Over time, if oil prices remain low, oil production will fall slowly, but permanently.

Based on conventional estimates of the responsiveness of supply to price changes, CBO estimates that stripper capacity would decline by 500,000 barrels per day in the first year that prices remained at $13.00 per barrel. Other estimates are roughly consistent with this level. The Interstate Oil Compact Commission, an organization of states with stripper wells, estimates that 640,000 and 280,000 barrels would be lost in the first year if prices remained at $10.00 and $15.00, respectively. Interpolation would give an estimate in the neighborhood of 400,000 at the $13.00 level.[1/] Another industry trade source estimates that 4.0 million barrels per day of production in the United States, Canada, and Western Europe would become uneconomic as prices fell from $24.00 per barrel to

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1. For more details, see Interstate Oil Compact Commission, *Impact of Decreasing Crude Oil Prices on Stripper Oil Wells, Production and Reserves* (Oklahoma City: no date).

$12.00.[2] Texas Eastern estimates that at $12.00 the U.S. loss would eventually total 1.5 million barrels per day, but that it would take several years to accumulate to this level. It is difficult to derive a first-year loss from this figure, however. Other industry sources estimate that the short-term production loss might be substantially less than the 400,000 to 500,000 barrels per day discussed above. All such estimates suffer from a lack of detailed knowledge of the cost structure of individual producers.

An oil import tariff could encourage domestic oil production and exploration, while an oil excise tax could discourage such production and exploration by reducing the price received by domestic producers. An energy tax would discourage the production of all domestic energy resources, including oil. To the extent that a motor fuels tax reduced oil demand, it would lower the prices received by producers as well, and therefore would also discourage domestic oil production.

The extent to which oil supplies would change, and the manner in which they did so, would again depend on whether the taxes were deemed temporary or permanent. An import tariff considered to be temporary would give producers incentives to exploit existing reserves at a more rapid rate, but not to increase their exploratory efforts. A tariff deemed permanent, however, would encourage more prospecting but would not change the intertemporal pattern of production from existing reserves. The reverse would be true for taxes that penalized oil exploration. An excise tax on oil that was permanent would lower current production from known reserves, but would leave the country with greater resources in later years.

Again, the effectiveness of an oil import tariff in encouraging domestic oil supply must be compared with that of other energy policy instruments. Stripper oil could be purchased for the Strategic Petroleum Reserve to keep those wells open. Domestic production has been encouraged in the past by tax incentives given to independent oil producers to encourage exploration and development.[3] But the larger integrated oil producers have been denied such subsidies, even though they produce much more, in terms of barrels of oil equivalent (boe) per well, than the industry as a whole. (The comparable figures in the 1980-1984 period were 377,000 boe for the wells of integrated producers as against only 75,000 boe for the industry as a whole.[4]) If the major aim is to encourage oil finds, changing

2. See L.J. Deman, "An Oil Price Floor?" (Texas Eastern Transmission Corporation: Houston, November 1985).

3. Congressional Budget Office, "Analysis of Special Tax Provisions Affecting Independent Oil and Gas Producers," Special Study (May 1983).

4. *Petroleum Intelligence Weekly*, January 27, 1986, p. 8.

the tax rules might substitute for an oil tariff. On the other hand, such tax subsidies represent a revenue loss, and imply that finding and depleting domestic oil deposits is a more efficient way to reduce oil import dependence than is conservation.

Finally, it should be noted that none of these policies would have a large impact on the long-term domestic supply of oil. Since 1979, more than half the drilling rigs in the world have been operating in the United States; yet despite the high oil prices during most of this period, proven U.S. reserves have not kept pace with U.S. oil consumption. [5]

EFFECTS OF OIL TAXES ON COMPETING FUELS

Both an import tariff and an excise tax on oil would tend to encourage the use of non-petroleum energy sources. Both would increase the price of oil to industrial users and utilities, where oil competes with other fuels such as coal and natural gas.

Most industrial fuel users are "dual-fuel capable"--that is, they can switch almost instantly from oil to gas for their heat or steam needs. Thus, natural gas competes strongly with residual oil even in the short run. Gas also competes with distillate, or home heating oil, but less so than with residual fuel. Higher prices for oil products would, therefore, lead fuel users to switch to natural gas, except in the case of an energy tax that taxed natural gas and oil almost equivalently.

But the natural gas market is marked by rigidities that remain from its period of federal regulation. When most gas was regulated at a price well below its oil-equivalent price, pipelines (which supply gas to local distribution companies) eagerly bought new supplies at prices that were far higher than regulated prices in an effort to maintain deliveries to valued customers, secure in the belief that they could "roll in" these higher-cost supplies with their endowments of cheaper, regulated gas. [6] As a result, large quantities of gas were contracted to pipelines at high prices that are unaf-

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5. Energy Information Administration, *1984 Annual Energy Review* (Washington, D.C.: Government Printing Office, 1985), pp. 67 and 79. See also *Petroleum Intelligence Weekly*, February 3, 1986, p. 8.

6. See Congressional Budget Office, *Understanding Natural Gas Price Decontrol* (April 1983), and *Natural Gas Price Decontrol: A Comparison of Two Bills* (November 1983).

fordable in today's market. The upward pressure on gas prices resulting from an oil import tariff or excise tax might, therefore, not be translated into greater gas supplies, since gas supplies are already going unused while these contract problems are renegotiated and resolved.

Oil prices do not affect the price of coal directly, but do so over time. This short-run independence is because coal and oil do not compete directly in many applications. While both produce electricity, utilities already have made significant attempts to replace oil-fired baseload generating equipment with coal. Moreover, the lead times required to increase coal supply are long. Thus, the imposition of an oil import tariff would increase the demand for coal, and with it the price of coal and the incentives for new coal supply, but only by small amounts in the short term. At the other extreme, an energy tax would penalize the production of coal. Moreover, to the extent that coal prices did change, it is more likely that they would do so because both coal and oil compete with natural gas.

EFFECTS OF OIL TAXES ON DOMESTIC OIL REFINERIES

A two-tiered oil tariff, such as that proposed by S. 1507, would levy a tariff of $10.00 per barrel on imported refined products in conjunction with a $5.00 per barrel tariff on imported crude oil. Its advocates argue that the refining industry needs to be protected because of national security concerns, because U.S. environmental regulations impose a special burden on the industry hampering its ability to compete with foreign refineries, and also because U.S. refiners are facing subsidized foreign competition. This section discusses these arguments and outlines some of the effects a two-tiered tariff would have on consumers and on the refining industry.

National Security

Refining capacity would be a security concern for the United States only if U.S. consumers had access to crude oil but were not able to refine it. Given current and projected worldwide excess petroleum refining capacity, this seems unlikely. Any shortage will be of crude oil, not of refining capacity.

At current import levels, a cutoff of refined products from the Persian Gulf--the most severe possible product disruption--would be of minor concern compared to a cessation of crude oil flow. In 1985, the United States was importing only 60,000 barrels per day of petroleum products from the Persian Gulf, or about 1 percent of its total oil imports and less than 0.4 percent of its total oil consumption.[7] Enough excess capacity is avail-

7. *Petroleum Supply Monthly* (December 1985), pp. 44-45.

able at home and abroad to more than compensate for such a loss in refined products. In Rotterdam, Western Europe, and the Pacific basin, refineries are operating well under capacity.

The level of petroleum product imports is not projected to reach levels in the future that could cause concern for national security. The highest estimate of light product imports over the next five years is 1.3 million barrels per day. Other studies place the likely level at 0.4 to 0.8 million barrels per day. [8] Current operable refining capacity in the United States is 15.8 million barrels per day. [9] Even if some of that capacity is illusory, the loss of a few hundred thousand barrels per day in refining capacity would not pose a security or economic threat to the United States even though it would represent a substantial economic loss to those directly involved.

Moreover, the problems faced by U.S. refiners are not primarily caused by increased product imports. The 15 percent decline in U.S. refining capacity stems mainly from the large decrease in demand following the rapid oil price increases of the late 1970s. In 1978, U.S. oil refiners and product importers supplied 18.8 million barrels per day of refined petroleum products to U.S. consumers. By 1985, they were supplying only 15.7 million barrels per day, a 16 percent decline. Over this period, petroleum product imports fell from an average of 2.3 million barrels per day in the 1970s to less than 2.0 million barrels per day in the 1980s. As a share of U.S. consumption, product imports have risen only from 11 percent of domestic consumption in 1978 to 12 percent in 1985. [10] Gross import figures do not give the complete story, since many product imports need further refining and blending in the United States before they can be used. For instance, in 1985, imports of unfinished oil and blending stock were as large as those of finished gasoline imports. [11]

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8. See *Outlook for Light Product Imports into the United States* (New York: Petroleum Industry Research Foundation, June 1985), p. VI-3. See also Pace Company Consultants & Engineers, *The Effect of Increasing Petroleum Products Imports of the United States Refining Industry* (Washington, D.C.: Independent Refiners Coalition, June 1985), p. 3. The United States has always imported heavy fuel oil; the increase in imported light pfoducts is a more recent concern.

9. *Weekly Petroleum Status Report*, January 24, 1986, p. 4.

10. *Petroleum Supply Monthly* (December 1985), pp. 2-3. See also Energy Information Administration, *Annual Energy Review 1984* (Washington, D.C.: Government Printing Office, 1985), pp. 89 and 105.

11. *Petroleum Supply Monthly* (December 1985), p. 45.

Even if refining capacity were viewed as a constraint in the event of an import shortfall, the more appropriate response might be to fill a portion of the Strategic Petroleum Reserve with refined products rather than with crude. The additional cost to the economy would be only the differential between the costs of crude oil and refined products on those millions of barrels the government bought, the carrying cost of resources tied up in the reserve, and the more costly storage such a scheme would require, as compared with the cost of a $5.00 extra tariff on all oil products.

Environmental Costs in the Refining Industry

Another argument for a two-tiered tariff is that the pollution abatement costs imposed on refiners by U.S. environmental laws render them uncompetitive. S. 1997 would impose an additional $3.00 tariff on the basis of this factor alone. U.S. refiners' pollution abatement costs are, however, probably less than $0.50 per barrel. They arise from three sources: conventional pollution abatement costs; fees to support the Superfund; and the cost of reducing lead in gasoline.

U.S. pollution regulations add an estimated $0.30 to the cost of refining each barrel of oil. In 1983, pollution abatement operating costs, including capital depreciation, were $1.8 billion for the petroleum refining industry. 12/ This was offset by material and energy recovered in the pollution abatement process, which reduced its net pollution control to $1.3 billion. When spread over almost 4.4 billion barrels of crude oil and other inputs processed in 1983, the refiners' net pollution abatement costs came to $0.30 per barrel. 13/ In addition to the pollution abatement costs, a charge of 0.79 cents per barrel is imposed on all oil used as chemical feedstock, whether crude or refined, imported or domestic, to pay for the cleanup of abandoned hazardous waste sites. 14/ Proposals have been made to raise this fee by several cents per barrel, but the additional charge would be applied to all oil and therefore would not affect the competitive position of U.S. refiners.

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12. Bureau of the Census, *Current Industrial Reports, Pollution Abatement Costs and Expenditures 1983* (Washington, D.C.: Government Printing Office, 1985), p. 40. Other data sources report higher gross pollution abatement costs, but it is difficult to adjust these for resource recovery and capital depreciation.

13. *Weekly Petroleum Status Report* (January 24, 1986), p. 4.

14. Joint Committee on Taxation, *Background and Issues Relating to House Bills for Reauthorization and Financing of the Superfund* (Washington, D.C.: Government Printing Office, 1985), p. 11.

The Environmental Protection Agency has estimated that the cost of reducing the lead in leaded gasoline is less than two cents per gallon (or $0.84 per barrel).[15] Leaded gasoline currently accounts for 20 percent of the petroleum products refined in the United States, and its share of output is projected to decrease independently of the lead rules.[16] These rules therefore should cost U.S. refiners no more than 16 cents per barrel of crude oil refined. The cost of reducing lead varies roughly in proportion with the cost of crude oil, and consequently an oil tax that raised the cost of crude oil would increase the cost of reducing lead.

Finally, all U.S. industries bear some pollution abatement costs; the refining industry is not entitled to special protection on that ground. Moreover, oil producing countries building new refining capacity may value their environmental amenities differently than does the United States. For them, economic development may have priority over a cleaner environment. In that respect, these countries could be thought of as exporting their environmental quality to the United States. Prohibiting them from doing so would lead to the typical costs of trade restriction: higher costs in the United States, and lower output and employment in the industries that use refined products as an input.[17]

Subsidized Foreign Competition

U.S. refiners have also argued that they need a two-tiered tariff because the U.S. industry is being hurt by subsidized competition. Specifically, some countries have been building modern refineries as part of their economic development plans, and governments have been subsidizing them through a variety of mechanisms.

In the past, "low-priced" product exports have been a means by which OPEC members cheated on their cartel arrangements. There is anecdotal evidence that the internal transfer price of crude oil to national refineries

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15. U.S. Environmental Protection Agency, *Costs and Benefits of Reducing Lead in Gasoline: Final Regulatory Impact Analysis* (February 1985). See also, Department of Energy, *Gasoline Octane Enhancement: Technology, Economics, and Environmental, Health and Safety Considerations* (July 1985).

16. Energy Information Administration, *1984 Petroleum Supply Annual* (Washington, D.C.: Government Printing Office, 1985), p. 48.

17. Congressional Budget Office, *Environmental Regulation and Economic Efficiency* (March 1985), pp. 96-7.

was often below the price at which it was available for export. 18/ It is difficult to estimate the degree of subsidy, since to do so would require detailed knowledge of the selling prices and quantities of every product sold by the refineries in question, but there is evidence that this strategy was widely used. 19/ Given the amount of refining capacity that was being planned for OPEC countries, this subsidy seemed likely to depress profit margins for years to come and eventually reduce investment and capacity in the U.S. refining industry. 20/

The recent drops in the price of oil have limited the ability of foreign producers to engage in this type of cross-subsidy. Led by Saudi Arabia, many are now pricing their crude oil for export at what are called "netback prices," under which a refiner buying crude oil pays a price equal to the sales value of the products at the time the crude oil is delivered to the refinery. Netback pricing makes natural resource subsidies very difficult, since if the subsidy drives down product prices in the importing country it will also drive down the netback price and, at the limit, eliminate the value of the subsidy.

It would be premature to say that the introduction of netback pricing has eliminated every form of subsidized foreign competition for U.S. refiners. Only one form of subsidy has been eliminated. Those remaining are likely to be more transparent, however, as well as illegal. In that case, more vigorous enforcement of current trade law may be preferable to new legislation. 21/

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18. For an extended discussion of such "natural resource subsidies," see CBO, "The Economic Effects of Countervailing Duties on Natural Resource Input Subsidies," Staff Working Paper (September 1985).

19. See Petroleum Industry Research Foundation, "Outlook for Product Imports into the United States" (June 1985), p. II-4.

20. On the other hand, many of the plans for increasing OPEC refinery capacity have been shelved because they proved unfeasible or because of the increasing financial constraints of OPEC governments. See Henry Lee and Bijan Mossaver-Rahmani, "Emerging Trends in U.S. Refining and Petroleum Product Trade: Implications for Energy Security Policy" (Cambridge: Harvard University, Kennedy School of Government, December 1985), pp. 21-22.

21. For a discussion of state-owned firms and some problems in current international trading agreements, see Kenneth Dam, *The Gatt: Law and International Economic Organization* (Chicago: University of Chicago Press, 1970), pp. 316-332. For a more recent discussion, see Gary Hufbauer and Joanna Erb, *Subsidies in International Trade* (Washington, D.C.: Institute for International Economics, 1984), pp. 100-102.

Effects of a Two-Tiered Tariff on Consumers and the Refining Industry

A tariff of $5.00 per barrel on crude oil and $10.00 per barrel on refined products would raise consumer prices and increase domestic refiner and shipping company profits. As long as demand remained below about 16.5 million barrels per day of refined products, domestic refining capacity would presumably be able to provide for all U.S. product needs without imports. In this case, the $5.00 surcharge on refined products would raise no revenue, though it would prevent the country from consuming the cheapest supplies of refined oil products. (See Table 1 for current and projected consumption levels.) Beyond the 16.5 million barrel level, domestic consumption would outstrip domestic refining capacity and refined products would be imported despite the $5.00 penalty. Domestic product prices would rise in response, and from the perspective of U.S. consumers the effects would be roughly the same as a $10.00 tariff on crude oil. The additional costs would, however, only profit domestic refiners and shippers. Because crude oil could be imported with only a $5.00 tariff, there would be little upward pressure on domestic crude oil prices beyond the initial $5.00. Thus, the added tariff on refined products would provide little incentive for oil exploration and/or development.

U.S. refiners have a rated capacity of 16.5 million barrels per day of oil products. Because a barrel of oil expands in volume when it is refined, refiners can supply products in quantities greater than their input capacity ratings. Current estimates suggest that they could refine 15.8 million barrels of crude oil per day.[22] In 1984, the average refinery gain was 4.4 percent.[23] The crucial question in estimating the limits of domestic supply is how closely domestic refiners could approach their rated capacity. The $5.00 differential of a two-tiered tariff would provide them with strong incentives to run their refineries at capacity. In the longer term, they could reopen facilities that are now closed as uneconomic.

Even if domestic refining capacity was sufficient nationally to cover domestic consumption, the East Coast would suffer disproportionately under a two-tiered tariff because of additional transport costs. The area circumscribed by District I of the Petroleum Administration for Defense accounts for 80 percent of imports of gasoline and blending components, 90 percent

22. *Weekly Petroleum Status Report*, March 7, 1986, p. 4. It is uncertain whether all of the rated capacity would be available if needed.

23. Energy Information Administration, *Petroleum Supply Annual 1984* (Washington, D.C.: Government Printing Office, 1985), p. 48.

of residual fuel oil imports, and two-thirds of all oil product imports. 24/ The high level of imports means that spare refining capacity in the district is minimal: perhaps 215,000 barrels per day. 25/

In the event of a two-tiered tariff, District I would have to import 50 percent more refined petroleum products from other parts of the country than it normally does to avoid the extra $5.00 levy. Currently, gross shipments of petroleum products into this district from other parts of the country total roughly 2.7 million barrels per day, and the district relied on imports of foreign products of 1.3 million barrels per day in 1985. 26/

Much evidence suggests that the existing transportation system would be able to accommodate a 1.3 million barrel per day increase in interdistrict traffic, but at a cost. Currently, roughly 75 percent of interdistrict traffic flows through oil pipelines, while trucks, tankers, and barges handle the remainder. 27/ Oil pipelines are currently operating at roughly 85 percent of capacity and could provide an additional 300,000 to 450,000 barrels per day. As noted above, the district has about 200,000 barrels per day of unused refining capacity--not all of which would be readily available. Halting petroleum product shipments from District I to other districts (about 300,000 barrels per day) might also help fill needs, but would in turn produce shortages in the Midwest (District II). The remainder of the 1.3 million barrels per day would have to be shipped in by tankers or barges under the U.S. flag. Petroleum product carriers that are currently laid up could carry approximately 300,000 barrels per day. The remaining 50,000 to 200,000 barrels per day would have to be obtained by the use of converted crude oil carriers, barges, and rearranged scheduling. While the industry might be able to accomplish this, it would be a costly undertaking because the Jones Act and cabotage laws make transportation using U.S.-flag ships quite expensive. At current transportation rates, the additional cost would be as high as $0.50 per barrel. Moreover, domestic tanker rates would probably rise significantly under higher traffic.

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24. Energy Information Administration, *Petroleum Supply Annual 1984* (Washington, D.C.: U.S. Government Printing Office, 1985) pp. 52-53. See also *Petroleum Supply Monthly* (December 1985), pp. 40-41.

25. *Petroleum Supply Annual 1984*, p. 82.

26. Ibid, p. 41. Imports in 1984 were similar (*Petroleum Supply Annual 1984*, p. 53).

27. *Petroleum Supply Annual 1984*, pp. 66-68.

Over time, these transportation capacity constraints would be reduced as refineries currently shut down were reopened. Most of the shutdown capacity is either old or inefficient. In District I, capacity of 440,000 barrels per day was shut down during the 1981-1985 period. Nationally, close to 3.0 million barrels per day of capacity has been shut down in the last five years. 28/ With the $5.00 per barrel cushion provided by the two-tiered tariff, much of this capacity would become economic again. Half of it was built during the 1970s to take advantage of biases in oil price control and entitlements regulations (such as the so-called "small refiners' bias"), and proved uneconomic after the lifting of the price controls. 29/ Of these refineries, many lack the capacity to produce a high yield of gasoline and other lighter products, or to use the lower grades of crude oil that are becoming more common. A two-tiered tariff would once again encourage the building of such refineries.

A VARIABLE TARIFF

Several proposals have been made to vary the level of an energy tax according to the level of oil prices. S.1997 would set a crude oil import duty to equal the difference between the world market price for oil and a reference price of $22.00, with a 50 cent minimum. Some refined product imports would face a similar tax, but would bear an additional $3.00 per barrel "environmental outlay adjustment." Refined product tariffs would also be adjusted for heat content. The reference price and the environmental outlay adjustment would be adjusted annually for inflation. This report does not include the net budgetary effects of this proposal, since the revenues obtained would depend on the oil price assumption chosen. Since 1970, the price of oil has increased or decreased three times by amounts of $10.00 or more, and future price levels appear no less uncertain. Thus, whatever the advantages of S. 1997 for energy policy, its budgetary effects are difficult to appraise.

Rationale

A variable tariff would support the U.S. oil industry and would put downward pressure on OPEC oil prices, but fail to address the "social cost" rationale

28. Henry Lee and Bijan Mossavar-Rahmani, *Emerging Trends in U.S. Refining and Petroleum Product Trade: Implications for Energy Security Policy* (Cambridge: Harvard University, Kennedy School of Government, December 1985), p. 44.

29. Ibid., p. 41.

for oil taxes. Instead, it would implicitly assume that the social premium attached to oil imports is higher at low prices and is nonexistent at prices above some arbitrary level. Under the provisions of S. 1997 no tariff would have been imposed in 1980, although the U.S. Strategic Petroleum Reserve barely existed, world prices were at an all-time high, and two major oil producers (Iraq and Iran) were engaged in a war that could have spread to the rest of the Persian Gulf. Today, however, when the Strategic Petroleum Reserve is large and excess capacity exists both within and outside OPEC, the tariff would be high. Thus, the tariff's chief advantages would be that it could protect most U.S. stripper wells, and could help reduce the federal deficit at the expense of foreign oil producers.

S. 1997 also raises one central energy policy question: how would the Congress determine the reference price? The intent of the bill is to stabilize the industry at roughly its current size, but whether $22.00 is a more appropriate benchmark than, say, $18.00 cannot be determined with any confidence. The average variable cost of producing oil in the United States in 1984 was roughly $5.00 per barrel, excluding windfall profit tax. On the other hand, according to one industry source, at a level of $22.00 per barrel between 5 percent and 10 percent of stripper wells, accounting for between 0.5 percent and 1 percent of oil and natural gas liquids production, become uneconomic. 30/ Lowering the reference trigger price from $22.00 to $18.00 would, according to the same source, eliminate another 1.0 percent of production, but would channel $23 billion more into the hands of oil consumers.

Technical Issues

The bill also raises several technical issues. These have to do with the $3.00 environmental outlay adjustment, the inflation adjustment calculation, and the method of adjusting product imports for heat content. Also, certain product imports would be exempt from the tariff. The first issue has been dealt with in a previous section; this section discusses the others.

Inflation Adjustment. The reference price and the environmental outlay adjustment would be recalibrated annually to take account of "inflation" as measured by per capita GNP. But changes in per capita GNP may reflect changes in three variables: inflation, economic growth, and population. Only one of these--inflation--is relevant to the question of whether oil drilling and production costs have risen sufficiently to warrant a new reference price.

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30. See Interstate Oil Compact Commission, *Impact of Decreasing Crude Oil Prices on Stripper Wells, Production and Reserves.*

Heat Content. S. 1997 would adjust the tariff on some refined product imports according to their heat content. However, the value of refined products is generally inversely correlated with their heat content. The tariffs on more expensive refined products would, under this provision, be set lower than those for cheaper products. Tariffs on refined products would still be more than those for crude oil, because product tariffs would bear the additional $3.00 environmental outlay adjustment. However, if the Congress eliminated the environmental quality adjustment, or reduced it to the level of actual expenses incurred (perhaps $0.30 per barrel, as noted above), most product tariffs would be lower than those for crude oil. Such a tariff could be devastating to the U.S. refining industry.

Product Exemption. The bill would exempt home heating oil, process fuels, and residual fuel oil from the tariff. In 1984, these products accounted for roughly 25 percent of domestic consumption. 31/ Exempting them from the tariff would encourage foreign refiners to increase their exports of these products to the United States. Domestic refiners, whose crude oil costs would have risen by the amount of the tariff, would find their profits very much reduced. The refining process will always result in the production of a certain amount of residual and distillate fuel oil, although the proportions vary according to the type of crude oil and other factors. 32/ Because they will always have these products to sell, U.S. refiners will have no choice but to match foreign prices even when they are exempted from an import duty.

OTHER ISSUES

The Strategic Petroleum Reserve

A previous CBO paper discussed the possibility of imposing an oil import tariff to finance the Strategic Petroleum Reserve (SPR). 33/ The SPR now contains about 495 million barrels of oil, and is being filled at a rate of about 29,000 barrels per day. While this is far from the 750 million barrels originally envisioned by the Congress, it still affords substantial protection against oil import disruption. The SPR drawdown capacity has only been

31. Energy Information Administration, *1984 Annual Energy Review* (Washington, D.C.: Government Printing Office, 1985), p. 113.

32. In a modern U.S. refinery, distillate and residual fuel oil account for 40 percent of the yield from even a "light" crude oil, such as that obtained from the North Sea. See "Oil Markets Reconsidered--1984 and Beyond," *Petroleum Intelligence Weekly*, April 22, 1985.

33. Congressional Budget Office, *Charging for Federal Services* (December 1983).

tested once, making drawdown rate estimates somewhat uncertain. Current estimates are that the SPR could be drawn down at a rate of 3.3 million barrels per day for at least 90 days.

In its efforts to reduce U.S. oil vulnerability, the government is expected to spend $3 billion in 1987 and more in later years. At current fill rates, the SPR is projected to cost roughly $500 million each year for the next five years, including both oil purchases and building and operations costs. The current fill rate is roughly one-tenth the 1981 fill rate of 292,000 barrels per day. Federal agencies also engage in a sizable amount of energy research and development to reduce U.S. oil dependence. While much of this expenditure would continue even if there were no energy problem, vulnerability provides a significant part of its rationale. Such research is projected to cost more than $2.5 billion in 1987, including work in fossil energy, energy supply, and energy conservation, and to increase in subsequent years.

A proposal to dedicate oil tariff revenues to a more rapid expansion of the SPR would raise two issues: whether it would be appropriate to dedicate such revenues, and whether the 750 million barrel target should be maintained or reduced. One cost of dedicating revenues is the loss of fiscal control by the Congress. Even if the need for the activity should decline, the steady provision of dedicated revenues would maintain it, and the Congress would lose one avenue for reducing the deficit. The main advantage is that applying user fees to federal activities forces users to confront the costs of their actions. An oil import tariff would be a user fee. It could be considered an insurance premium applied to the "risks" posed by oil import dependence, as discussed above. To the extent that consumers force the economy to bear certain risks--such as vulnerability to oil import disruption, which necessitates military expenditures to defend oil supply routes or foreign oil fields--it can be argued that they should pay these added social costs.

A second issue is whether the SPR target of 750 million barrels should be maintained. When the expansion to 750 million barrels was originally contemplated, U.S. oil consumption, imports, and OPEC imports were all higher than they are now. Achieving the target would thus provide more protection that originally intended, as measured in days of supply. On the other hand, lower oil prices may increase U.S. imports dramatically in the next five years, and a larger SPR would then be required in the event of future world oil disruptions.

Benefits of Cooperation

Oil taxes would have their maximum effects on prices if imposed by all or most major oil-consuming countries. Since the United States accounts for only one-third of world oil consumption (outside the centrally planned economies), its actions can have only a limited effect on world oil prices. The six other major industrial countries belonging to the Organization for Economic Cooperation and Development (OECD) represent 60 percent of the demand, and so would add much greater leverage should they choose to work together with the United States in imposing new oil taxes. Action in concert would force producers of oil to reduce their prices, thus easing the burden of the tax.

Such concerted action is hindered by the fact that the United States has been the only major oil consumer not to implement sizable oil taxes since the first oil price shock in 1973. In fact, until President Carter's decision to decontrol oil in 1979, U.S. oil prices were regulated at a level below world oil prices. Aside from the 9 cent gasoline tax and 15 cent diesel fuel tax that support the Highway Trust Fund, and an incidental tax devoted to Superfund, no federal taxes are imposed on energy consumption in the United States. Higher U.S. oil taxes will thus be required before the level of energy taxation is equal among the major industrialized countries.

Most other industrialized countries have much larger oil consumption taxes than the United States. Their gasoline taxes are typically in the neighborhood of $1.00 per gallon, with additional taxes and/or import duties on distillate and residual fuel oils in the $1.00 to $1.50 per barrel range--although distillate fuel oil taxes in Europe sometimes exceed $10.00 per barrel. 34/ It should be noted that these countries tend to rely much more on consumption taxes as revenue sources than the United States does; for that reason many products, not just oil, have higher taxes placed on them.

Some of these countries have already begun to discuss placing additional taxes on oil and/or energy in response to the recent oil price drops. The British government has proposed an additional motor fuels tax of 10 cents per gallon. Several European countries have already boosted their taxes on various motor fuels, and several more are expected to follow. 35/ According to industry observers, of the major European consuming countries, only West Germany is not likely to raise its oil taxes.

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34. For a survey of foreign oil taxes, see Energy Information Administration, *International Energy Annual 1984* (Washington, D.C.: Government Printing Office, 1985), pp. 47-61.

35. *Petroleum Intelligence Weekly* (March 10, 1986), p. 2.

CHAPTER IV

OTHER EFFECTS OF OIL TAXES

Changes in economic policy as significant as the oil taxes discussed in this paper would have many effects on the economy. This chapter discusses possible changes in U.S. trade patterns, changes in the ability of less developed countries to repay their international debts, and changes in the distribution of income in the United States.

EFFECTS ON U.S. TRADE AND COMPETITIVENESS

An oil import tariff or an excise tax on crude oil could improve the balance of trade, although the effect on the dollar would be somewhat ambiguous. A reduction in oil imports of 400,000 barrels per day would reduce the value of U.S. imports by approximately $3.4 billion annually. This would put upward pressure on the dollar. At the same time, however, the international transactions demand for dollars might decline as the world price of oil fell, since all oil is sold in dollars. A $5.00 per barrel oil tariff, if absorbed by producers to the extent assumed in this analysis, would reduce the rest of the non-Communist world's oil import bill by approximately $13 billion in the first year following its enactment. This would translate into an immediate reduction in the demand for dollars. This saving would also provide a stimulus for the oil-consuming economies, and their expansion would result in a greater demand for U.S. goods and the dollars with which to buy them. Thus, the effects of oil taxes on currency values cannot be predicted with confidence.

Whatever the net effects of oil taxes on the balance of trade and exchange rates, U.S. comparative advantage in international trade would be likely to shift away from those industries that are relatively oil intensive or energy intensive, since their foreign competitors would not be paying an added tariff on their energy or oil inputs. 1/ This would force U.S. firms to reduce their output or else accept smaller margins. Taxes that increase the

1. Many U.S. trading partners already impose substantial taxes on both gasoline and industrial petroleum products. Japan, for instance, has a tax of $1.78 per barrel on distillate fuel oil. See Energy Information Administration, *1984 International Energy Annual* (Washington, D.C.: Government Printing Office, 1985), p. 60.

price of industrial fuel oil would be likely to increase the price paid by users of natural gas and, perhaps in the long run, coal, which together account for half of industrial energy consumption (electricity and oil account for the other half). Since most electricity is generated by nuclear or fossil fuels, raising their prices would also increase the cost of electricity to industrial and commercial consumers. Industrial consumers alone account for over one-third of U.S. electricity consumed.[2] Energy taxes would raise these prices directly, but by less than would an equivalent oil tax. Gasoline taxes, on the other hand, would mainly affect service businesses that typically do not face international competition. Automobile production, of course, is an exception to this generalization.

The extent to which costs in particular industries might rise would be determined by their energy use and by their ability to substitute other productive inputs for oil or energy. Unfortunately, recent data on oil and energy use by industry are very incomplete, while the more complete analyses of oil use by industry date to 1977. A 1983 report by the Census Bureau counts only purchased fuels, and therefore may not include refiners who burn part of their output as plant fuel, or integrated steel companies that use their own coal and coke.[3] The 1977 input-output tables are more complete, but their use today requires the assumption of unchanged ratios of fuel use in the last 10 years.[4] Moreover, any data on the physical flow of energy or oil inputs into production will overstate the cost burden of oil taxes since no allowance is made for the possibility of input substitution in production.

Despite these limitations, both the Census Bureau report and the input-output tables suggest the same industries would be affected by increases in the price of oil, but that their costs would only rise by a few percentage points. Of the internationally traded goods industries, other than the refining industry, the paper industry seems to be the most vulnerable. Both analyses suggest that the paper industry's oil product purchases account for between 2 percent and 3 percent of its purchased inputs and

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2. Energy Information Administration, *1984 Annual Energy Review* (Washington, D.C.: Government Printing Office, 1985), p. 179.

3. Bureau of the Census, *1982 Census of Manufactures: Fuels and Electric Energy Used* (Washington, D.C.: Government Printing Office, 1983).

4. "Input-Output Structure of the U.S. Economy, 1977," *Survey of Current Business* (May 1984).

labor. The Canadian paper industry is located close to the U.S. market and supplies a significant fraction of U.S. consumption. It is also a significant consumer of natural gas and electricity. New England and the Middle Atlantic states account for the largest share of paper production and have a relatively large amount of oil-generated electrical capacity.

Chemical production would also feel the impact as natural gas prices rose in response to a tax; the chemical industry uses about 10 times as much natural gas, measured in energy content, as oil. 5/ Worldwide, there is excess capacity in every facet of the chemical industry, and many foreign producers have a sizable presence in the U.S. market, especially in the fertilizer market. 6/ The U.S. chemical industry also has substantial exports that could be placed at risk if their prices rose substantially.

Oil taxes would harm agricultural exports by increasing petrochemical costs, fuel costs, and transportation costs. According to the 1977 input-output tables, oil costs represent 7 percent of purchased inputs (non-land, non-capital equipment) in agriculture, and chemical products (discussed above) represent another 20 percent. 7/ Further, U.S. agricultural exports are already under challenge internationally: agricultural exports in January to November 1985 fell by a quarter from their 1984 level, while aggregate U.S. merchandise exports fell less than 2 percent during a similar period. 8/ U.S. agricultural exports accounted for 14 percent of total merchandise exports in the first three quarters of 1985. 9/

Other industries that have high energy costs are often more dependent on natural gas or coal than on oil. For instance, for the stone, clay, and glass industrial group, energy costs represent 11 percent of costs, but oil

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5. Bureau of the Census, *1982 Census of Manufactures: Fuels and Electric Energy Used* (Washington, D.C.: Government Printing Office, 1983).

6. See Congressional Budget Office, *Effects of Countervailing Duties on Natural Resource Input Subsidies* (September 1985).

7. Increased use of foreign fertilizer and other petrochemicals could reduce the negative effects of oil taxes on U.S. agricultural exports.

8. Council of Economic Advisers, *1986 Economic Report of the President* (Washington, D.C.: Government Printing Office, 1986), pp. 364 and 368.

9. Ibid., p. 368.

only accounts directly for 0.8 percent. Similarly, in primary metals industries, oil purchases represent only 6 percent of energy costs: natural gas and coal are much more important. 10/

THIRD-WORLD INDEBTEDNESS

Oil prices are an important factor in debt repayment by developing countries. Several major oil producers, most notably Mexico, appear unable to meet the required payments on their international debt. Recent declines in oil prices have aggravated their problems. Conversely, lower oil prices have eased the burden placed on oil-consuming debtor countries, such as Brazil. Oil-producing debtor countries hold only a fraction of the more than $900 billion worth of debt accumulated by countries other than the major industrialized countries. 11/ Consequently, some analysts argue that, on balance, decreases in world oil prices help debtor countries. On the other hand, a simple comparison of the total amount of debt owed by oil importers and oil exporters ignores how near default some of them are, and the concentration of debt in a few of them. Mexico alone accounts for one-ninth of all the outstanding debt (close to $100 billion) and had required several reschedulings of its obligations before the recent decline in oil prices. The only oil importer with a similar level of debt is Brazil, and it is much more secure in its ability to meet its debt payments.

In general, an oil tax would injure Mexico and other oil producers by lowering the price of their principal export more than it would assist countries such as Brazil by lowering the price of one of its imports. In the case of Mexico, an oil price reduction of $1.85 per barrel--the anticipated decline in response to a $5.00 import tariff--would lower revenues on oil exports of 1.5 million barrels per day by over $900 million. Conversely, a price decline of the same amount would benefit the Brazilian economy by about $400 million.

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10. Bureau of the Census, *1982 Census of Manufactures: Fuels and Electric Energy Used* (Washington, D.C.: Government Printing Office, 1983).

11. See Organization for Economic Cooperation and Development, *Statistics on External Indebtedness: The Debt and External Liabilities of Developing, CMEA and Certain Other Countries and Territories at End-December 1983 and End-December 1984* (Paris, 1985).

At the same time, an oil import tariff could create benefits for all debtor countries by lowering interest rates. Lower rates are to be expected if the federal deficit is reduced and if falling world oil prices result in lower inflation rates outside the United States, allowing foreign central banks to reduce their interest rates. An interest rate decline of one percentage point (100 basis points) would create benefits for Mexico as large as the decrease in its oil export revenues resulting from a $5.00 import tariff on crude oil.

The effect of U.S. oil taxes on Mexico would depend crucially on the level of oil prices before the taxes were imposed. At a price of $10.00 per barrel, it is unlikely that an additional $1.85 price reduction would make any substantial difference, given the previous $15.00 price drop. At prices in the upper teens, the impact of a tariff on Mexico's ability to meet its obligations might be considerable.

DISTRIBUTIONAL EFFECTS

The distributional effects of most of the oil tax options would not be large. While new oil taxes would be remitted by domestic refiners and importers, their true cost would be distributed among producers and users of energy. Some costs would be passed back to foreign suppliers through lower world oil prices. Most of the cost, however, would likely be passed forward to domestic consumers in the form of higher energy prices.

Effects on Consumers

Costs would be passed on directly through higher prices for energy products that were subject to the new taxes, and indirectly through higher prices for non-energy products that used energy inputs in their production.

Because prices for all forms of energy are interrelated, prices for non-taxed energy products would likely rise as well. Thus in the case of an oil import tariff, prices for domestic oil would rise by the full amount of the increase in foreign oil prices while the price of substitute energy commodities such as natural gas and coal would also rise by some amount.

Oil taxes would likely increase consumers' expenditures on energy products and cause them to decrease expenditures on some other commodities. With total expenditures held fixed, by an appropriate monetary policy for example, prices of other goods and services would decline, depressing wages and shareholder returns. The net reduction in real income to consumers would equal taxes paid less the amount passed back to foreign suppli-

ers; the loss in consumers' real income from the increase in the price of non-taxed energy goods would be fully offset by an increase in real income due to the reduction in the price of other goods and services.

Effects on Domestic Producers

The changes in relative prices resulting from oil taxes would also affect the distribution of income among producer groups. For example, under an oil import tariff, shareholders, landholders, and, to a more limited extent, employees in the oil industry and in coal and natural gas production would receive more income, and employees and shareholders in other industries would receive less income. How this would affect the distribution of income among different income groups is not clear, however.

Net Effects on Households

The net effects of new oil taxes on households would be twofold:

- Households would pay less than the full burden of the tax because some of the costs would be shifted to foreign suppliers.
- Household incomes would be redistributed as relative prices, wages, and corporate earnings adjusted.

Distribution of Energy Expenditures. It would be difficult, if not impossible, to trace out all of the distributional effects of oil taxes on households. This would require specification of how prices of different goods and services would increase as a result of higher energy costs in production and transportation, and estimation of the reduction in non-energy prices because of increased household spending on energy. Some insight into the effects of such taxes can be gained, however, by focusing on changes in direct household consumption of energy products. Because prices for all sources of energy are closely related, these changes would include the effects of higher prices on both taxed energy goods and untaxed substitutes. The changes would not include the indirect effects of higher prices on non-energy products that use energy inputs in their production, or of relatively lower prices for other goods and services, nor would they take account of changes in the distribution of income resulting from shifts in the amount of income originating in different industries.

The distribution of energy expenditures is depicted in this section as both a percentage of income and a percentage of total expenditures.

Because income is measured only over one year, energy expenditures as a percent of income may overstate the usual fraction of income spent on energy. A family's income may fall temporarily for one year, perhaps because of a short-term layoff, a spell of unemployment, or, for the self-employed, a period of low or negative earnings. Families experiencing a temporary drop in income are likely to maintain their previous level of consumption, including expenditures on energy, in the expectation that their income will return to its normal level.

Ideally, income data would cover a number of years so that temporary declines or increases in income would not have a pronounced effect. Because total expenditures generally are thought to reflect long-term income, total expenditures may be a better proxy for permanent income than is income from a single year. Thus energy expenditures as a percent of total expenditures may better measure the fraction of income spent on energy over the long term.

Energy expenditures in 1982 and 1983 (adjusted to reflect energy prices consistent with a $23.00 per barrel price of oil) were a much higher percent of income for low-income families than for others. Families with incomes of less than $5,000 spent between 25 percent and 30 percent of their income on energy, compared with average expenditures of just over 7 percent of income for all families. 12/ Families with incomes of $50,000 or more spent just under 5 percent of their income on direct energy consumption. Energy expenditures as a percent of income are highest in the Midwest and lowest in the West. The distribution by income within each region was quite similar, taking into account regional differences in total expenditures.

The degree to which energy expenditures as a percent of one year's income overstate the fraction of income spent on energy by low-income consumers can be illustrated by looking at income measured over some longer period. While income data for more than one year are not currently available from the 1982-1983 survey, it is possible to measure income over

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12. All data are from the Bureau of Labor Statistics, *Consumer Expenditure Survey*, 1982 and 1983. The percent of income spent on energy by families with incomes under $5,000 is partially distorted in the West by unusually low incomes and high expenditures on energy by low-income families. Even though incomes for low-income families in the West averaged only $1,000, their average energy expenditures were higher than the average for families in the West with income between $5,000 and $10,000, and proportionally much higher than the energy expenditures observed for low-income families in the West in 1980 and 1981.

two years using data from the 1980-1981 survey. These data show that for families with incomes less than $5,000 per year, energy expenditures as a percent of income fall from 30.3 percent to 20.0 percent when income is measured as the average over two years.

In some ways these data may understate the percent of income spent on energy by some low-income families. The data do not include indirect costs of utility and fuel expenditures to renters who do not pay their own utility bills. Because the proportion of renters is greater among low-income families, this will tend to understate energy expenditures for those families. In addition, the energy expenditure data do not include payments made directly to suppliers on behalf of low-income families by either public or private energy assistance programs.

In contrast to income-based measurements, the percent of expenditures allocated to energy for low-income families is close to that for all families. Low-income families allocate 9.6 percent of their expenditures to energy, compared with 9.0 percent for all families. Energy expenditures as a percent of total expenditures decline with incomes above $10,000, but by far less than energy expenditures as a percent of income, remaining within two percentage points of the overall average in all income classes. The pattern of energy expenditures as a percent of average total expenditures by region follows the same pattern as the percent of income spent on energy. The percentages are lowest in the West and highest in the Midwest.

The regional distribution of total energy expenditures hides some important differences in the components of these expenditures across income and regions. Except for the lowest and highest income classes, gasoline expenditures make up an increasing percent of total energy expenditures as income rises. The percent spent for fuel oil declines with income, as does the percent spent on natural gas in all but the highest income category. Gasoline expenditures are a much larger percent of total fuel expenditures in the West than in other regions, while the percent of expenditures allocated to fuel oil in the Northeast is more than four times the percent spent in any other region.

These data suggest the following general results:

- Because energy expenditures as a percent of income are highest for the lowest-income groups and decline sharply as income rises, the relative burden of oil taxes as a percent of income would be highest for low-income families. However, because energy expenditures as a percent of total expenditures are roughly constant across income classes, the relative burden of oil taxes

as a percent of permanent incomes might not vary greatly across incomes. This latter measure, although not perfect, is probably a better measure of the regressivity of energy taxes.

- Because energy expenditures are about the same percent of total expenditures across income levels, the distributional effects of oil taxes would be similar to the distributional effects of more broadly based consumption taxes, but slightly more regressive.

- Taxes that increased the relative price of fuel oil would have the greatest impact on the Northeast region, while taxes that increased the relative price of gasoline would have the greatest impact on the West. However, because the share of gasoline as a percent of total energy expenditures rises with income, a motor fuels tax would be somewhat less regressive than the other energy taxes.

Distributional Effects of Specific Oil Taxes. The distributional effects on households of the five specific oil taxes are considered in the following tables. Table 9 shows how such taxes would have affected income and expenditures in 1982-1983, assuming that oil prices were $23.00 a barrel. They would have raised fuel expenditures as a percent of total income and total expenditures. The distribution of increased expenditures across income levels in each of the plans would be as expected, declining as a percent of income but roughly constant as a percent of expenditures as income increases. The average dollar change in energy expenditures in each of the five plans would be approximately the same, varying by no more than 5 percent of the average over the five plans.

There would be only slight differences in the change in average energy expenditures as a percent of income or of total expenditures among the plans. The energy tax, the oil import tariff, and the excise tax would be slightly more regressive than the other two tax plans, but the differences would be so small that many would regard them as negligible. One reason why the distributional results for the plans look so similar is that none of the taxes would greatly increase average energy expenditures.

While the distribution of the change in expenditures by income class is a good measure of the burden of the tax relative to a family's ability to pay, a better measure would take account of differences in family size. One such measure is the official poverty threshold determined each year by the Bureau of the Census. However, the data necessary to reclassify families by their income status relative to the poverty line are available only for 1980 and 1981.

TABLE 9. ESTIMATED EFFECTS OF OIL TAXES ON AVERAGE ANNUAL FUEL EXPENDITURES OF HOUSEHOLDS, BY INCOME, 1982-1983

Income Level	Import Tariff	Excise Tax	Motor Fuels Tax	Combination of Taxes	Energy Tax
All Income Levels					
Increase in fuel expenditures (in dollars)	77	75	72	73	70
As percent of income	0.3	0.3	0.3	0.3	0.3
As percent of total expenditures	0.4	0.4	0.4	0.4	0.4
Less Than $5,000					
Increase in fuel expenditures (in dollars)	33	31	27	29	33
As percent of income	1.3	1.2	1.1	1.1	1.3
As percent of total expenditures	0.4	0.4	0.3	0.4	0.4
$5,000 to $9,999					
Increase in fuel expenditures (in dollars)	45	43	37	39	46
As percent of income	0.6	0.6	0.5	0.5	0.6
As percent of total expenditures	0.5	0.4	0.4	0.4	0.5
$10,000 to $19,999					
Increase in fuel expenditures (in dollars)	62	61	57	58	57
As percent of income	0.5	0.5	0.5	0.5	0.5
As percent of total expenditures	0.5	0.5	0.4	0.4	0.4

(Continued)

When this poverty-line measurement is used, the energy tax appears somewhat more regressive. Poor families would pay 7 percent of the total increase in energy expenditures under a broad-based energy tax as opposed to shares ranging from 4.3 percent to 5.5 percent for the other taxes. Families in poverty would have the smallest relative burden under the motor fuels tax, but even here the difference from the burden imposed by other

TABLE 9. Continued

Income Level	Import Tariff	Excise Tax	Motor Fuels Tax	Combination of Taxes	Energy Tax
$20,000 to $29,999					
Increase in fuel expenditures (in dollars)	76	74	71	72	65
As percent of income	0.4	0.4	0.4	0.4	0.4
As percent of total expenditures	0.5	0.5	0.4	0.4	0.4
$30,000 to $39,999					
Increase in fuel expenditures (in dollars)	89	88	87	87	78
As percent of income	0.4	0.4	0.4	0.4	0.3
As percent of total expenditures	0.4	0.4	0.4	0.4	0.4
$40,000 to $49,999					
Increase in fuel expenditures (in dollars)	103	100	100	100	89
As percent of income	0.3	0.3	0.3	0.3	0.3
As percent of total expenditures	0.4	0.4	0.4	0.4	0.3
$50,000 and Over					
Increase in fuel expenditures (in dollars)	123	119	119	118	108
As percent of income	0.2	0.2	0.2	0.2	0.2
As percent of total expenditures	0.3	0.3	0.3	0.3	0.3

SOURCE: Congressional Budget Office.

NOTE: Oil prices are assumed to be $23.00 per barrel.

taxes would be relatively small. Comparing simple expenditure burdens, however, may overstate the effects of oil taxes on poor families. About one-half of poor families receive most of their income from transfer payments. Because the real value of these transfers is maintained either explicitly through cost-of-living increases or implicitly through periodic adjustments, these families would be protected from most, but not all, real

59-536 O - 86 - 2

income losses resulting from additional oil taxes. In other ways, the same approach may understate the effects. The data do not include the indirect cost of fuel and utility expenditures to renters who do not pay their own utility bills. Poor families are much more likely than the rest of the population to rent rather than own their homes. Finally, poverty status is determined on the basis of a single year's income. As discussed previously, this may not accurately reflect a family's true income status over the longer term.

Table 10 shows the effects of oil taxes on household expenditures by region when oil prices are $23.00 per barrel. Here again the effects in relation to both income and expenditures would be quite small and, except for the oil import tariff, there would be little difference among the five plans. The Northeast region would do slightly better than the rest of the country under the motor fuels tax. The West region would do better under the energy tax. The biggest losses, however, would be for the Northeast region under the oil import tariff. Because of insufficient local refining capacity and the cost of shipping domestically refined oil, the Northeast would also face higher home heating oil and motor fuel prices than the rest of the country as a result of the additional $5.00 import tariff on refined products.

Distributional Effects with Alternative Price Assumptions. The analysis up to this point has assumed an oil price of $23.00 per barrel. The distributional effects would be largely unchanged under price assumptions of $18.00 or $13.00 per barrel. However, while the relative change in energy expenditures across incomes would be the same, the dollar increase in energy expenditures at all income levels would be very different in at least one case.

Table 11 shows the change in overall average energy expenditures under the five tax proposals at three levels of oil prices. The change in average energy expenditures would be virtually the same for the three price assumptions under the excise tax, the motor fuels tax, and the combination of taxes. Because the energy tax would be a percent of the final sale price of energy products, the average increase in energy expenditures from this tax would be smaller with lower oil prices. However, the change in energy expenditures as a percent of income or total expenditures would be almost identical at the three oil prices.

Under the import tariff, the change in average energy expenditures would be more than twice as high if oil prices were $13.00 per barrel instead of either $23.00 or $18.00 per barrel. This follows from the assumption, dis-

TABLE 10. ESTIMATED EFFECTS OF OIL TAXES ON AVERAGE ANNUAL FUEL EXPENDITURES OF HOUSEHOLDS, BY REGION, 1982-1983

Region	Import Tariff	Excise Tax	Motor Fuels Tax	Combination of Taxes	Energy Tax
All Regions					
Increase in fuel expenditures (in dollars)	77	75	72	73	70
As percent of income	0.3	0.3	0.3	0.3	0.3
As percent of total expenditures	0.4	0.4	0.4	0.4	0.4
Northeast					
Increase in fuel expenditures (in dollars)	101	78	59	68	70
As percent of income	0.5	0.4	0.3	0.3	0.3
As percent of total expenditures	0.6	0.4	0.3	0.4	0.4
Midwest					
Increase in fuel expenditures (in dollars)	73	77	74	75	77
As percent of income	0.3	0.3	0.3	0.3	0.3
As percent of total expenditures	0.4	0.4	0.4	0.4	0.4
South					
Increase in fuel expenditures (in dollars)	70	74	76	75	71
As percent of income	0.3	0.3	0.3	0.3	0.3
As percent of total expenditures	0.4	0.4	0.4	0.4	0.4
West					
Increase in fuel expenditures (in dollars)	67	71	77	73	59
As percent of income	0.3	0.3	0.3	0.3	0.2
As percent of total expenditures	0.3	0.3	0.4	0.4	0.3

SOURCE: Congressional Budget Office.

NOTE: Oil prices are assumed to be $23.00 per barrel.

TABLE 11. ESTIMATED EFFECTS OF OIL TAXES ON AVERAGE ANNUAL FUEL EXPENDITURES OF HOUSEHOLDS AT THREE LEVELS OF OIL PRICES, 1982-1983

Income Levels	Import Tariff	Excise Tax	Motor Fuels Tax	Combination of Taxes	Energy Tax
Oil Price: $23.00 per Barrel					
All Income Levels					
Increase in fuel expenditures (in dollars)	77	75	72	73	70
As percent of income	0.3	0.3	0.3	0.3	0.3
As percent of total expenditures	0.4	0.4	0.4	0.4	0.4
Oil Price: $18.00 per Barrel					
All Income Levels					
Increase in fuel expenditures (in dollars)	78	77	72	74	65
As percent of income	0.3	0.3	0.3	0.3	0.3
As percent of total expenditures	0.4	0.4	0.4	0.4	0.3
Oil Price: $13.00 per Barrel					
All Income Levels					
Increase in fuel expenditures (in dollars)	169	79	71	74	59
As percent of income	0.7	0.3	0.3	0.3	0.3
As percent of total expenditures	0.9	0.4	0.4	0.4	0.3

SOURCE: Congressional Budget Office.

cussed previously, that at $13.00 per barrel domestic demand would exceed the domestic supply of refined products, and prices would reflect the additional $5.00 tariff on refined products.

Under this tax option, average energy expenditures at $13.00 per barrel would be only 2 percent less than energy expenditures at $18.00 per barrel. This would generally be true for all income classes and regions.

EXEMPTIONS AND REFUNDS

Proposals have been made to exempt certain consumers and producers of oil from any new tax or tariff, and to compensate low-income households for their increased expenditures.

Exemptions for Home Heating Oil

Exempting home heating oil from a $5.00 per barrel tax or tariff would cost $1.3 billion, although the administration of such a program might prove difficult and the loss to the Treasury could be much larger if cheating became prevalent. In 1984, U.S. households consumed 710,000 barrels per day of distillate fuel oil, up 6 percent from the previous year.[13] Assuming domestic heating oil consumption remained in the 700,000 barrel per day range and all taxes on crude oil were passed uniformly across all products, then a program to hold heating oil prices steady would consume a substantial portion of the net deficit reduction provided by an oil import tariff.

Administering such a program might pose some difficulties. Home heating oil accounts for only one-quarter of all distillate fuel oil, 0.7 million barrels per day out of 2.8 million barrels per day. The remainder is used in heating commercial structures, as industrial fuel, and as diesel fuel. A $5.00 per barrel exemption or rebate at the refinery gate or entry port might encourage reclassification of products in order to qualify for such a program. However, administering a rebate or refund program farther downstream in the distribution network would increase the administrative costs. At the consumer level, such a program would be very complex administratively.

This administrative complexity suggests that the Congress ought to consider very closely the goals of such a program. If helping low-income people is a concern, an alternative would be to provide income grants. Most home heating oil is not consumed by poor people: heating oil consumption rises absolutely with income. If horizontal equity is a concern, the exemption should be extended to other products, since people who drive to work would feel their income reduced as much as would people who heat with oil.

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13. Energy Information Administration, *1984 Annual Energy Review* (Washington, D.C.: Government Printing Office, 1985), p.113.

Exemptions for Mexican and Canadian Imports

Proposals have been made to exempt Mexican and/or Canadian oil from a tax or tariff. In order to avoid massive shuffling of import sources, a quota would obviously have to be set for such exemptions. Current gross or net import levels would be one choice for a quota level. Mexican net imports in 1985 were 750,000 barrels per day.[14] A 750,000 barrel per day exemption for Mexican imports would reduce tariff revenues by $1.0 billion. Canadian net imports in 1985 were 700,000 barrels per day. Providing this level of Canadian imports with an exemption would reduce tariff revenues by $950 million.

Exemptions for the Virgin Islands

Under current law, goods manufactured in the U.S. Virgin Islands are exempt from U.S. tariffs. The Virgin Islands are a major refining center. At the current level of imports (240,000 barrels per day), if this exemption were applied to a $5.00 tariff or excise tax, tariff revenues would fall by $440 million. Given the benefit of a tax exemption, however, the yearly throughput of Virgin Islands refining would be likely to rise to 300,000 or 325,000 barrels per day (recent peak levels of throughput), and the sources of oil for the refinery would shift to foreign oil. The decline in tariff revenues might then rise to between $550 million and $600 million per year. Exemption for the Virgin Islands would also give refiners enormous incentive to place more refineries there, in which case the Treasury loss would be substantially higher.

Exemptions for Domestic Oil Sources

If the Congress chose to put an excise tax on all oil, both domestic and refined, some Members might argue that certain domestic oil producers should be exempted in the same way as some domestic oil producers are currently exempt from the windfall profit tax. The major categories of exempt producers include state and local governments and their agencies, qualified educational and medical institutions, Indian tribes, and the first 1,000 barrels per day of output from independent producers. Wells producing less than 10 barrels per day are also exempt. Exempting all of these categories of oil from a $5.00 per barrel excise tax would reduce excise tax revenues by $3.1 billion per year.

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14. *Oil Supply Monthly* (December 1985), p.44. Previous years are in the 700,000 to 830,000 barrels per day range.

Compensation for Low-Income Households

Energy taxes, like any broad consumption tax, are regressive in that they take a somewhat greater percentage of the income of poor people. Many of the effects of higher oil prices would be felt indirectly by consumers; they could not be alleviated with simple exemptions from tax on one or more products. Poor families would pay about 7 percent of the total increase in energy expenditures resulting from a broad-based energy tax, and between 4.3 percent and 5.5 percent of the corresponding costs under other options. Therefore, the burden on the poor could be offset with a relatively small loss in net budgetary gains. About one-half of poor families currently receive most of their income from transfer payments; because the real value of these transfers is maintained either explicitly through cost-of-living increases or implicitly through periodic adjustments, these families would be protected from much, but not all, of any real income loss. 15/

One way to provide further protection for the poor would be to raise the earned income credit or otherwise use the tax system to compensate for the lost income. This would only partially alleviate the burden on the poor, because only about one-third of all poor families receive an earned income credit. The rest do not receive the credit either because they have no income from earnings or they have no children. In 1983 the average earned income credit was $286. A $40.00 increase in the average credit could be achieved by raising the rate at which the credit was applied by 14 percent--from 10 percent to 11.4 percent--and making an equivalent change in the rate at which the credit was phased out. Doing so would raise the total cost of the credit by about $250 million.

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15. Since poor people spend a larger than average share of their income on energy, an inflation adjustment based on the Consumer Price Index would not perfectly compensate them.

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